IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

This PHOTOFACT Folder Set is

WIRE-SEALED FOR YOUR PROTECTION

to guarantee completeness of contents

DO NOT ACCEPT IF SEAL HAS BEEN BROKEN

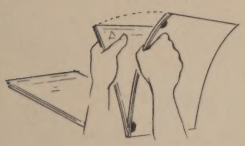
TO OPEN ***JUST DO THIS:***

1

Take hold of the Set with both hands. Place your thumbs directly under the top wire-seal; then, divide the contents equally by putting your thumbs midway through the thickness of the Set. Now, pull the two sections apart at the top, firmly.

2

Repeat this process, pulling close to the wire-seal at the bottom, so that the set is now divided into two equal parts.



3

Continue this "pulling-apart" process with the section in which the wire-seals remain, dividing it in half.

4

Finally, remove the wire-seals left in the last section; this can easily be done with your fingernail or any sharp instrument.

Your "Safety-Sealed" PHOTOFACT Set is now ready for profit-making use . . .

IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

The PHOTOFACT® Servicer

SET 498 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ SEPT. 1960

CONTENTS PHOTOFACT SET 498

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PRODUCTION CHANGE BULLETIN 243	
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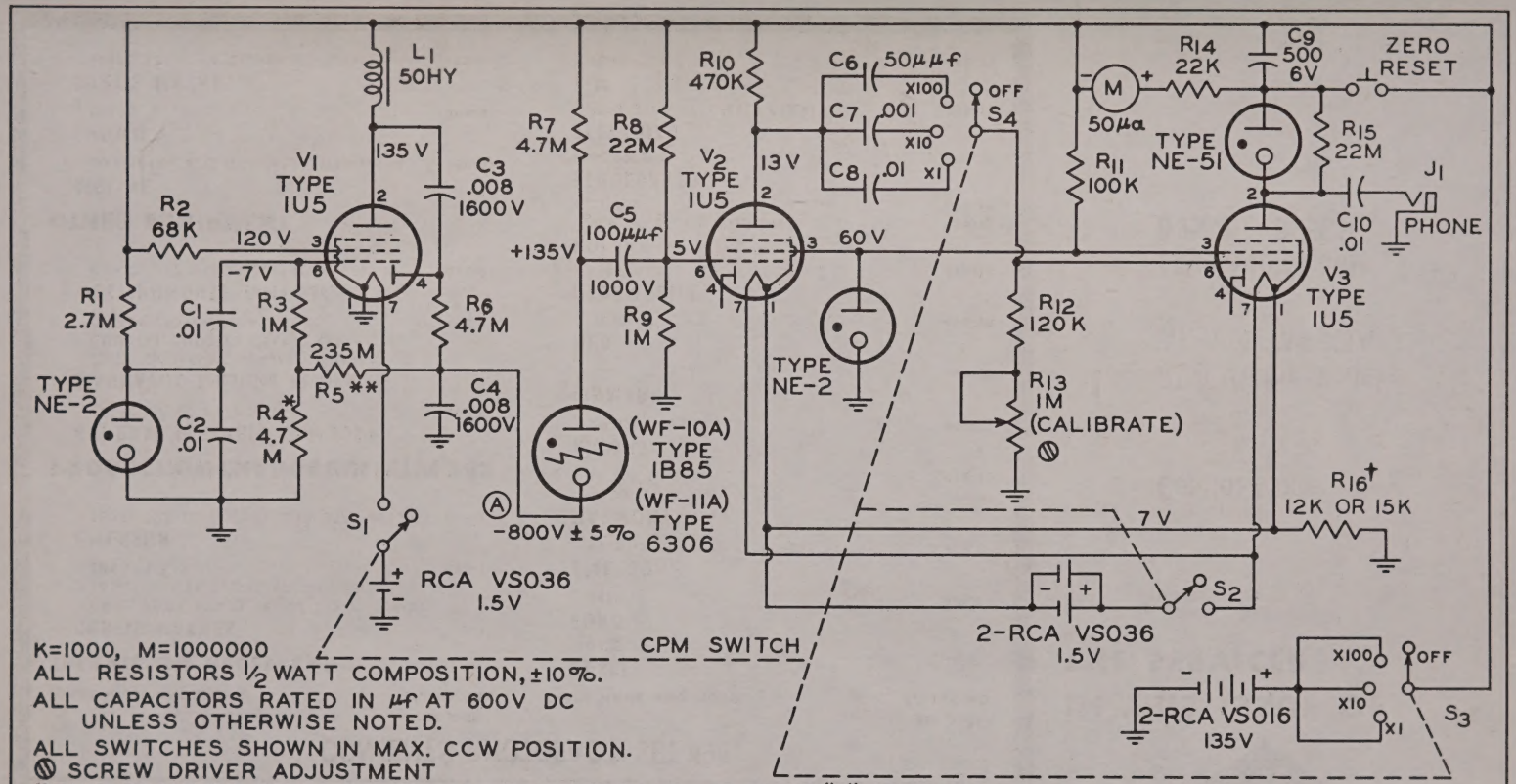
This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

IN THIS ISSUE OF THE SERVICER:

Capitol Model
832

RCA Victor Models
WF-10A, WF-11A

Truetone Models
D2584U, D2585U



K=1000, M=1000000

ALL RESISTORS ½ WATT COMPOSITION, ±10%.

ALL CAPACITORS RATED IN μf AT 600V DC UNLESS OTHERWISE NOTED.

ALL SWITCHES SHOWN IN MAX. CCW POSITION.

Ⓢ SCREW DRIVER ADJUSTMENT

*THIS RESISTOR SELECTED TO MAINTAIN VOLTAGE AT POINT "A" AT -800V.

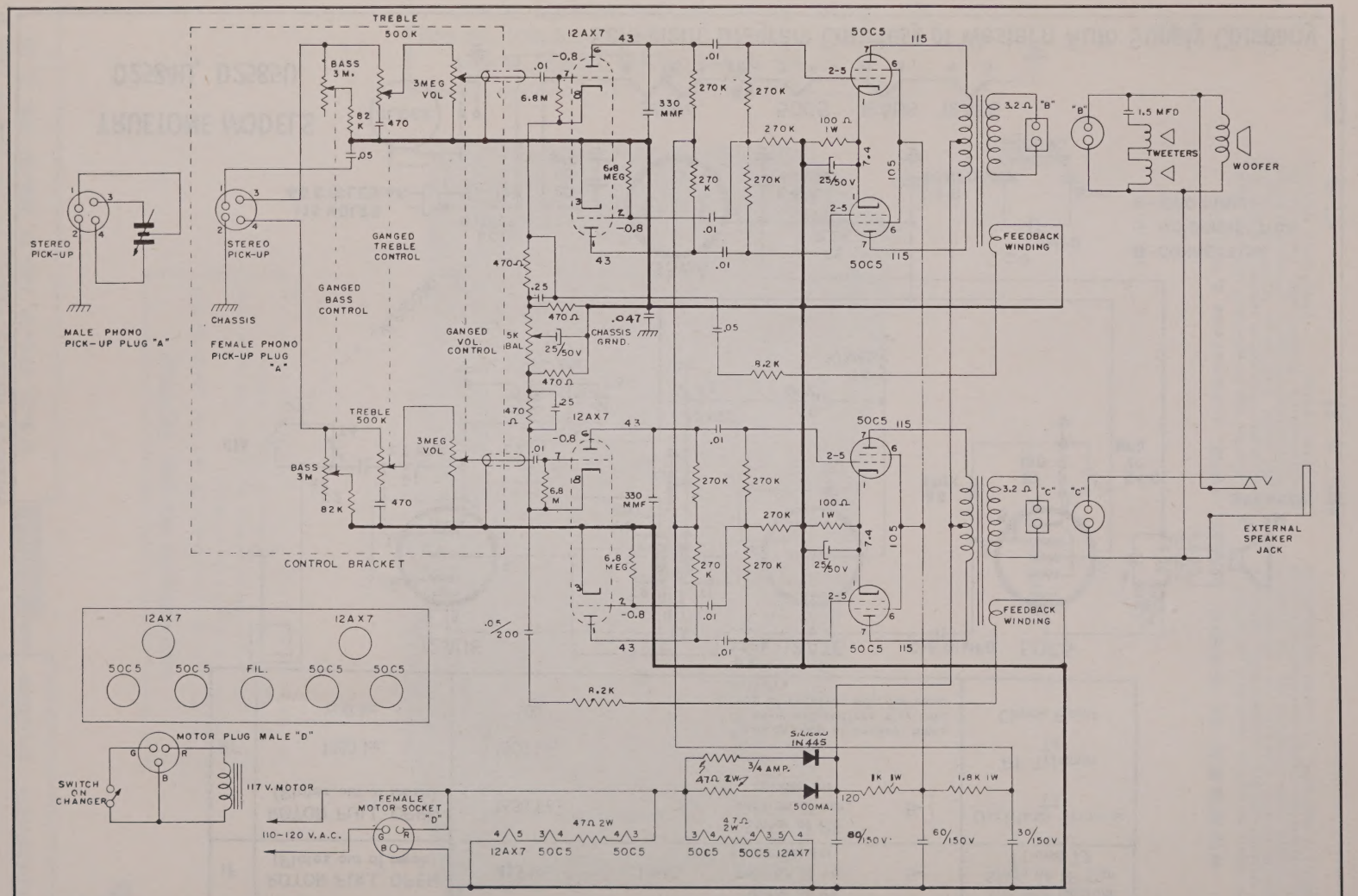
**IRC MVX-1 235-MEGOHM RESISTOR

†VALUE SELECTED FOR INDIVIDUAL INSTRUMENTS

ALL VOLTAGES ARE DC AND MEASURED WITH A VOLTOHMYST.® VOLTAGES SHOULD HOLD WITHIN ±20%. USE HIGH-VOLTAGE PROBE FOR MEASURING GEIGER-COUNTER TUBE VOLTAGES

RCA VICTOR (GEIGER-COUNTER)
MODELS WF-10A, WF-11A

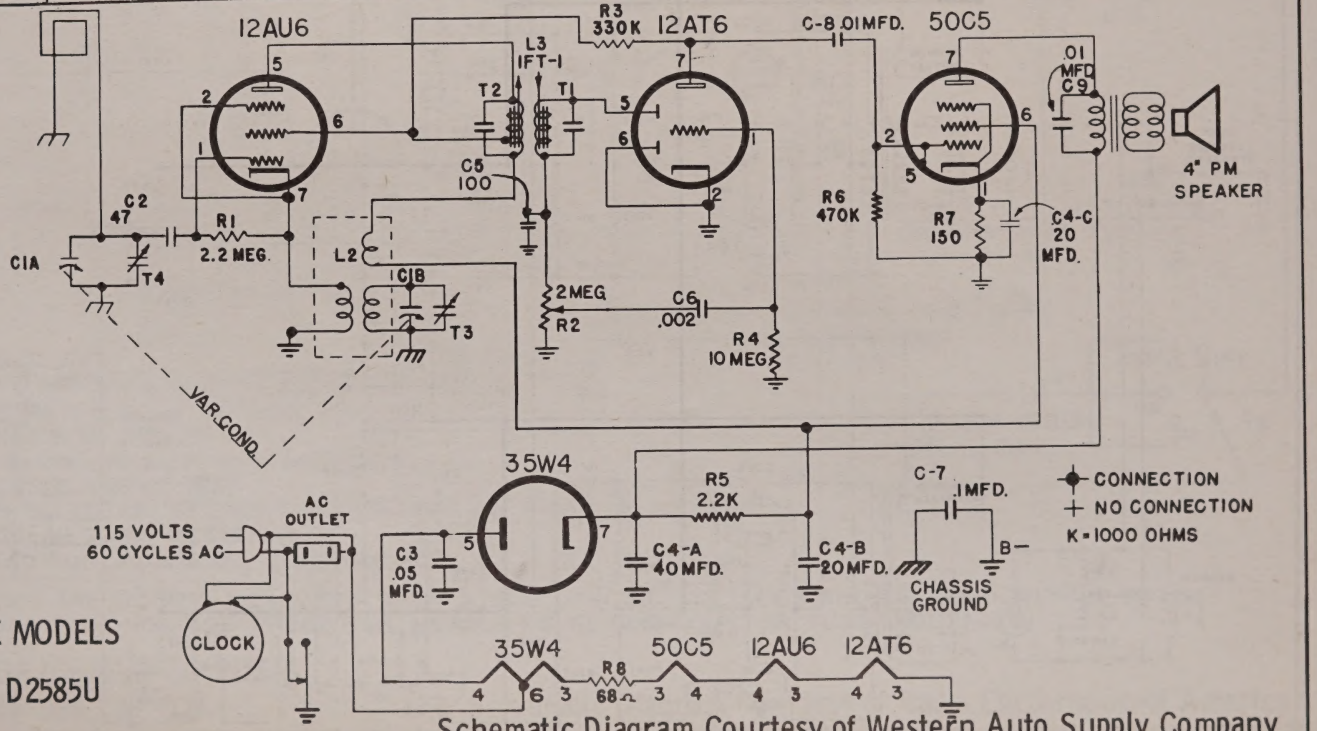
Schematic Diagram Courtesy of Radio Corporation of America



CAPITOL MODEL 832

Schematic Diagram Courtesy of Capitol Records, Inc.

	POSITION OF VARIABLE	SIGNAL GENERATOR				TRIMMER ADJUSTMENTS (in order shown)
		FREQUENCY	DUMMY ANTENNA	CONNECTION TO RECEIVER	GND. CONN.	
IF	ROTOR FULL OPEN (Plates out of mesh)	455 kc.	.1 mfd.	Stator of RF section of var. condenser	B-	Top and Bottom Slugs of IF Can T1 and T2
RF	ROTOR FULL OPEN (Plates out of mesh)	1650 kc.		Stator of RF section of var. condenser	B-	Oscillator Trimmer T3
	1500 kc.	1500 kc.				RF Trimmer T4
	600 kc.	600		Fashion loop of several turns of wire and radiate sig. into loop of receiver adj. for max. output.		Check Point



TRUETONE MODELS

D2584U, D2585U

Schematic Diagram Courtesy of Western Auto Supply Company

PHOTOFACT® Folder with CIRCUITRACE®

CURTIS MATHES MODELS 95-23, 96-23, 105-23, 106-23, 155-21, 156-21, 165-21, 166-21, 175-21, 176-21, 185-21, 186-21 (Ch. 5, 6)

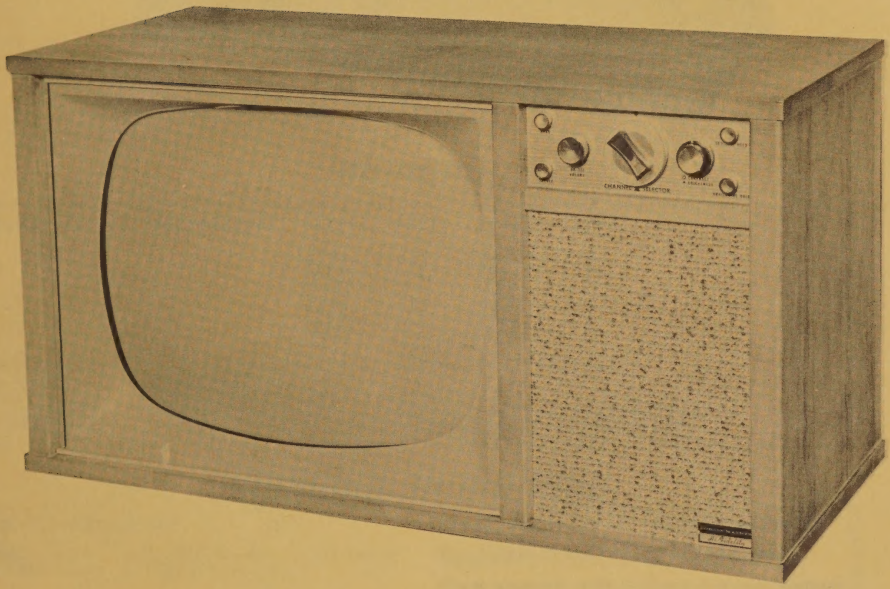
IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

CURTIS MATHES MODELS 95-23, 96-23, 105-23, 106-23, 155-21, 156-21, 165-21, 166-21, 175-21, 176-21, 185-21, 186-21 (Ch. 5, 6)

CURTIS MATHES MODELS 95-23, 96-23, 105-23, 106-23, 155-21, 156-21, 165-21, 166-21, 175-21, 176-21, 185-21, 186-21 (Ch. 5, 6)



MODEL 156-21 (CH. 6)

SET 498 FOLDER 1

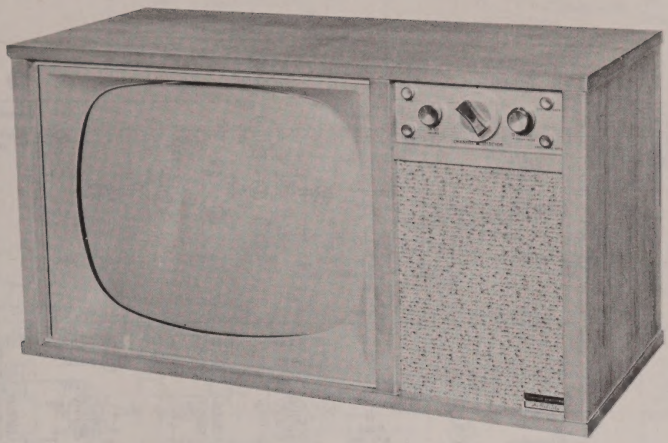
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

DATE 9—60 SET 498 FOLDER 1

CURTIS MATHES MODELS 95-23, 96-23, 105-23, 106-23, 155-21, 156-21, 165-21, 166-21, 175-21, 176-21, 185-21, 186-21 (Ch. 5, 6)

CURTIS MATHES MODELS 95-23, 96-23, 105-23, 106-23, 155-21, 156-21, 165-21, 166-21, 175-21, 176-21, 185-21, 186-21 (Ch. 5, 6)



MODEL 156-21 (CH. 6)

TRADE NAME	CURTIS MATHES	MODELS	CHASSIS	MODELS	CHASSIS
		95-23	5	96-23	6
		105-23	5	106-23	6
		155-21	5	156-21	6
		165-21	5	166-21	6
		175-21	5	176-21	6
		185-21	5	186-21	6
MANUFACTURER	Curtis Mathes Manufacturing Co., 2220 Young St., Dallas, Texas				
TYPE SET	Television Receiver				
TUBES	Eighteen (Chassis 6), Nineteen (Chassis 5)				
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING	200 Watts, 1.8 Amp. @ 117 Volts AC		
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)				

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 4 screws holding the trim strip at the top edge of the safety glass. Tilt glass out and remove.

FUSE

A fuse is used for low voltage supply protection. (For location, see "Tube Placement Chart".)

A fuse wire is used for filament protection. (For location, see M3 in photo "Chassis - Bottom View".)

TUNER OSCILLATOR ADJUSTMENT

To touch up the VHF Oscillator, remove Channel Selector and Fine Tuning Knobs.

AGC

The AGC may be varied by means of a Range Control. (For location, see "Tube Placement Chart".)

SYNC STABILITY

Sync Stability may be varied by means of a Sync Stability Control. (For location, see "Tube Placement Chart".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Coarse adjustment of the Horizontal Hold is accomplished by the proper setting of the Horizontal Frequency slug (B1). (For location, see "Tube Placement Chart".)

HORIZONTAL DRIVE

The horizontal drive may be varied by a Horizontal Drive Trimmer. (For location, see "Tube Placement Chart".)

BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Buzz control for MINIMUM buzz and maximum sound. (For location, see "Tube Placement Chart".)

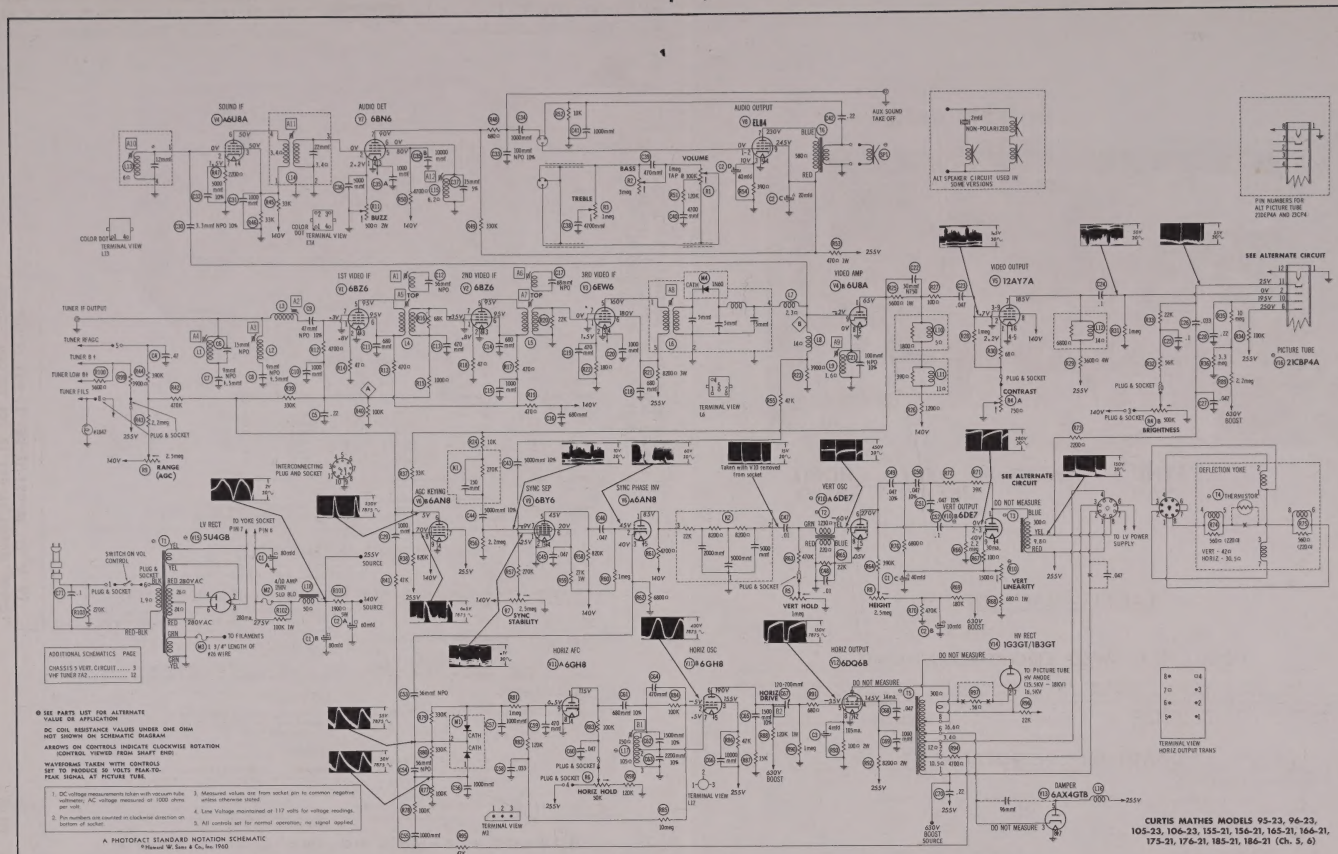
CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

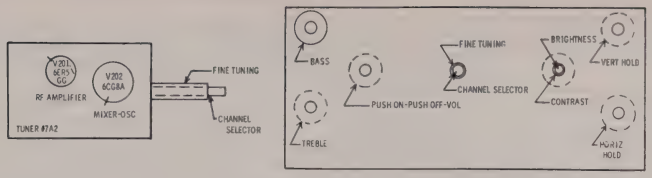
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

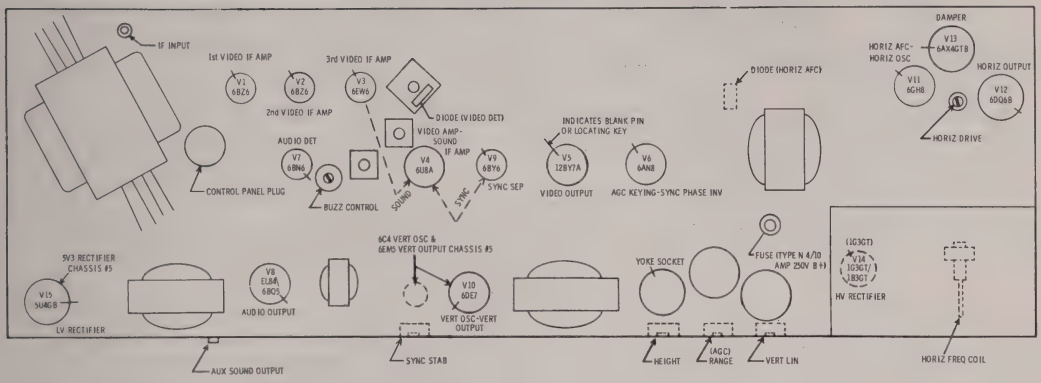
KA184


SOUND IF
AUDIO DET
AUDIO OUTPUT
AUX SOUND TAKE OFF
BASS
VOLUME
TREBLE
1ST VIDEO IF
2ND VIDEO IF
3RD VIDEO IF
VIDEO AMP
VIDEO OUTPUT
SEE ALTERNATE CIRCUIT
PICTURE TUBE
TUNER IF OUTPUT
TUNER AGC
TUNER B+
TUNER LOW B+
TUNER FILS
RANGE (AGC)
CONTRAST
BRIGHTNESS
INTERCONNECTING PLUG AND SOCKET
AGC KEYING
SYNC SEP
SYNC PHASE INV
VERT OSC
VERT OUTPUT
DEFLECTION YOKE
THERMISTOR
VERT - 42Ω
HORIZ - 30.5Ω
LV RECT
TO YOKE SOCKET
SWITCH ON VOL CONTROL
TO FILAMENTS
SYNC STABILITY
VERT HOLD
HEIGHT
VERT LINEARITY
TO LV POWER SUPPLY
HV RECT
TO PICTURE TUBE HV ANODE
HORIZ AFC
HORIZ OSC
HORIZ OUTPUT
HORIZ DRIVER
HORIZ HOLD
DAMPER
DO NOT MEASURE
ALT SPEAKER CIRCUIT - USED IN SOME VERSIONS
PIN NUMBERS FOR ALT PICTURE TUBE 23DEP4A AND 25CP4
TERMINAL VIEW HORIZ OUTPUT TRANS
ADDITIONAL SCHEMATICS PAGE
CHASSIS'S VERT. CIRCUIT 3
VHF TUNER TA2 12
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum-tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1960
CURTIS MATHES MODELS 95-23, 96-23, 105-23, 106-23, 155-21, 156-21, 165-21, 166-21, 175-21, 176-21, 185-21, 186-21 (Ch. 5, 6)

TUBE PLACEMENT CHART



TOP VIEW



TUBE FAILURE CHECK CHART

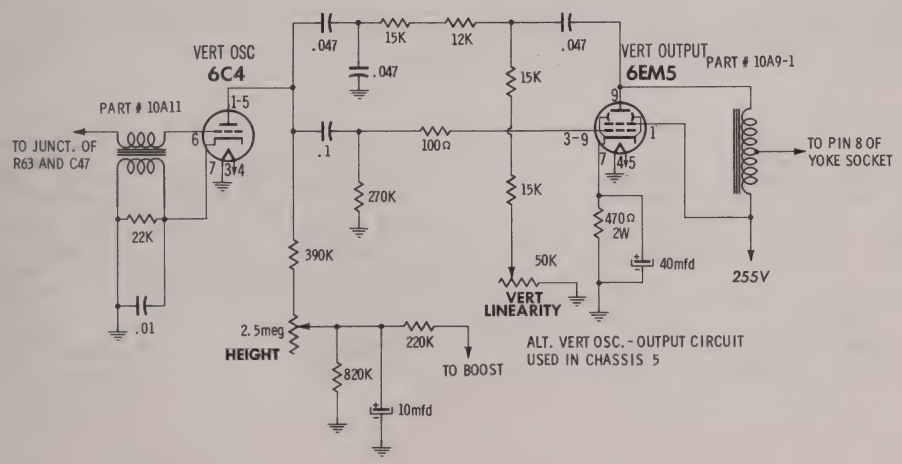
The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound V15, Fuse Wire (Fil.), Fuse (B+)

SWEEP FAILURE
No raster, has sound V11, V12, V13, V14, V16
No vertical deflection V10
Poor vert. linearity or foldover V10
Poor horiz. linearity or foldover V11, V12
Narrow picture V11, V12, V13, V15
Vert. off freq. V10
Horiz. off freq. V11, Diode (Horiz. AFC)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.)
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V5, V16
Has pic, no sound V4, V7, V8
Overloaded picture V6

SYNC FAILURE
No vert. sync V6, V9
No horiz. sync V6, V9, Diode (Horiz. AFC)
No vert. or horiz. sync V6, V9



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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CHASSIS 5 VERTICAL CIRCUIT

SET 498 FOLDER 1

CURTIS MATHES MODELS 95-23, 96-23, 105-23, 106-23, 155-21, 156-21, 165-21, 166-21, 175-21, 176-21, 185-21, 186-21 (Ch. 5, 6)

FOLDER 1

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #6282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to point Ⓐ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	High side to ungrounded tube shield floating over Mixer-Osc. Low side to chassis.	44.0MC (10MC Swp.)	47.25MC	Any non-interfering channel	Vert. Amp. thru detector probe (Fig. 1) to pin 5 (plate) of 1st Video IF. Low side to chassis.	A1	Adjust to place marker in trap notch as in Fig. 2.
2.	"	"	39.75MC 45.75MC 47.25MC	"	"	A2, A3, A4 and Mixer Plate Coil	Adjust for response similar to Fig. 2. A2 and the Mixer Plate Coil affects the shape of the top. A3 is adjusted to place 39.75MC marker. A4 is adjusted to place the 47.25MC marker.
3.	"	"	42.8MC	"	Vert. Amp. thru 10K to point Ⓑ. Low side to chassis. DC probe of VTVM thru 10K to same point. Common to chassis. (Across Video Det. load.)	A5	Increase Bias at point Ⓐ to 4.5 Volts DC. Adjust sweep output of generator for -2 Volts on VTVM at point Ⓑ. Adjust A5 for maximum gain at marker.
4.	"	"	41.25MC	"	"	A6	Adjust for MINIMUM gain at marker.
5.	"	"	45.3MC	"	"	A7	Adjust for maximum gain at marker.
6.	"	"	44.0MC	"	"	A8	"
7.	"	"	39.75MC 41.25MC 42.8MC 45.3MC 45.75MC 47.25MC	"	"		Check for response similar to Fig. 3 with markers as shown. If necessary, retouch A3 thru A8 for desired response. A8 controls symmetry of top. A 7 positions the 45.75MC marker and A5 positions the 42.8MC marker. DO NOT RETOUCH Mixer Plate Coil or A2.

4.5MC TRAP ALIGNMENT

Use 0-10 volts AC scale on VTVM. Set Contrast fully clockwise.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	High side thru .005mfd to point Ⓑ. Common to chassis.	4.5MC (Unmod.)	Any non-interfering channel	RF probe to pin 11 (cathode) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT

Tune in a TV signal and reduce signal level at the antenna terminals, by use of an adjustable attenuator or similar device, until a hiss similar to super-regeneration is heard in the sound.
Adjust A10, A11 and A12 for maximum undistorted sound. Adjust Buzz Control for MINIMUM buzz.

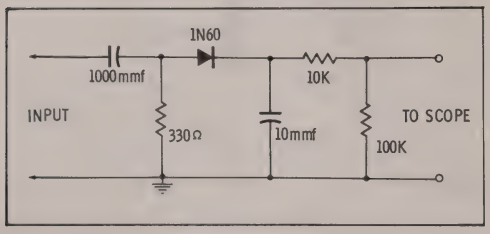


FIG.1

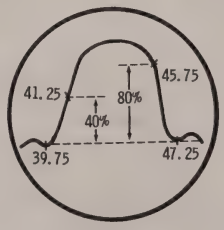


FIG.2

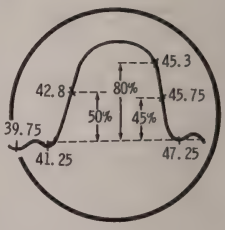


FIG.3

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A203 ..... GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537
A216 thru A227 ..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO #2531

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect the negative lead of a 4.5 volts bias supply to point ⏀. Positive to chassis.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.		Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point ⏀. Low side to chassis.	A201 A202 A203	Adjust A201 and A202 for maximum amplitude and symmetry with markers as shown in Fig. 201. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A203 to obtain MINIMUM response on the scope.
2.		"	213MC	211.25MC 215.75MC	13	"	A204	Adjust for maximum amplitude of response similar to Fig. 201. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A205	
			201MC	199.25MC 203.75MC	11		A206	
			195MC	193.25MC 197.75MC	10		A207	
			189MC	187.25MC 191.75MC	9		A208	
			183MC	181.25MC 185.75MC	8		A209	
			177MC	175.25MC 179.75MC	7		A210	
			85MC	83.25MC 87.75MC	6		A211	
			79MC	77.25MC 81.75MC	5		A212	
			69MC	67.25MC 71.75MC	4		A213	
			63MC	61.25MC 65.75MC	3		A214	
			57MC	55.25MC 59.75MC	2		A215	

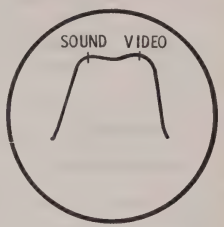


FIG. 201

OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.		Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. -load.	A216	Adjust to place sound marker in trap notch as in Fig. 202. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A217	
			201MC	199.25MC 203.75MC	11		A218	
			195MC	193.25MC 197.75MC	10		A219	
			189MC	187.25MC 191.75MC	9		A220	
			183MC	181.25MC 185.75MC	8		A221	
			177MC	175.25MC 179.75MC	7		A222	
			85MC	83.25MC 87.75MC	6		A223	
			79MC	77.25MC 81.75MC	5		A224	
			69MC	67.25MC 71.75MC	4		A225	
			63MC	61.25MC 65.75MC	3		A226	
			57MC	55.25MC 59.75MC	2		A227	

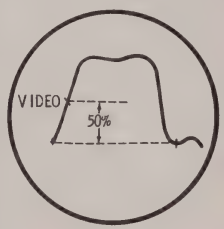
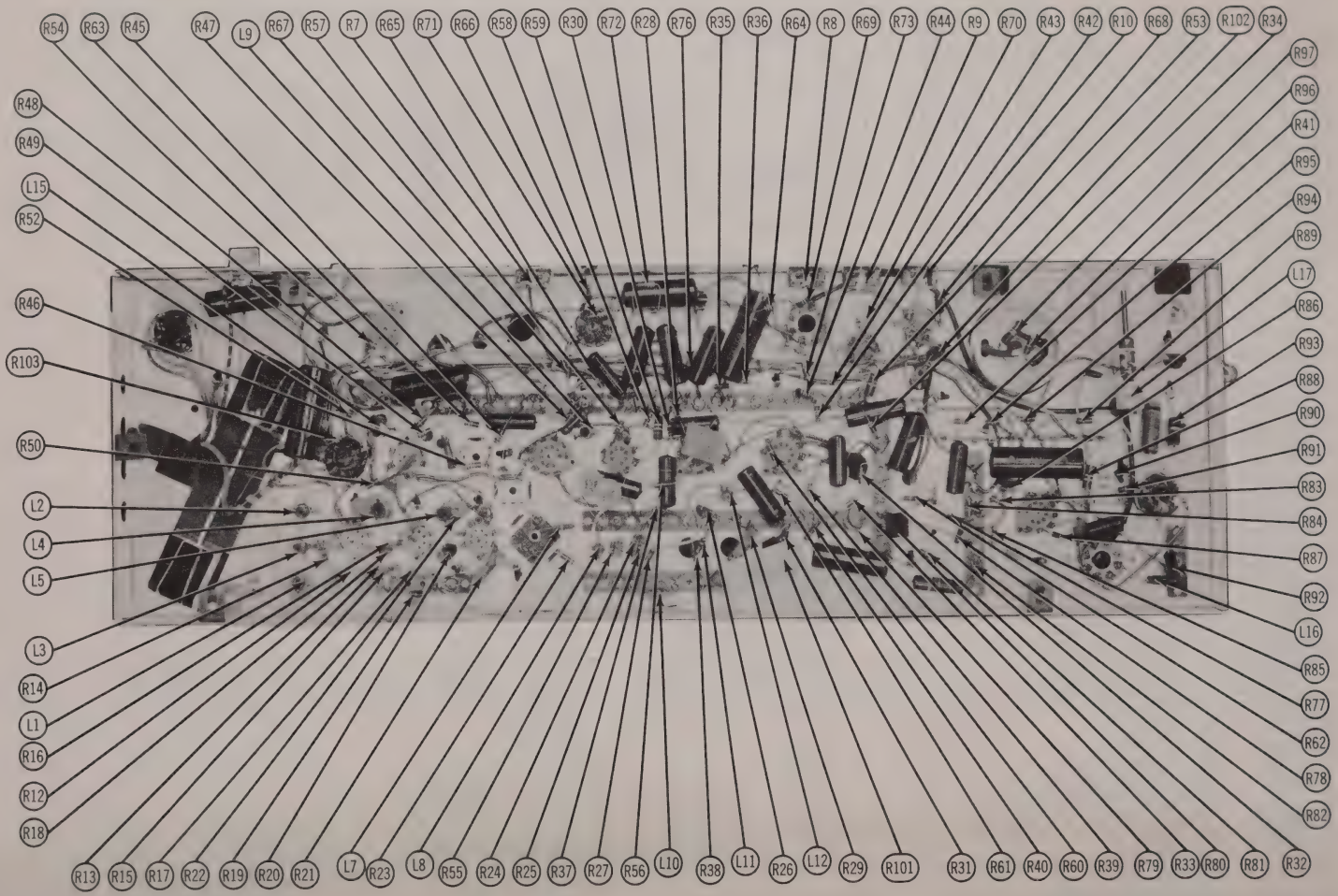


FIG. 202



CHASSIS BOTTOM VIEW - RESISTOR & INDUCTOR IDENT.

CHASSIS BOTTOM VIEW - CAPACITOR & MISC. IDENT.

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	CBS	GENERAL ELECTRIC	RAYTHEON	SYLVANIA
	USE	TYPE	USE	TYPE
V1	1st Video IF Amp.	6BZ6		
V2	2nd Video IF Amp.	6BZ6	Audio Output	EL84/6BQ5
V3	3rd Video IF Amp.	6BW6	Sync Sep.	6BY6
V4	Video Amp.-Sound IF Amp.	6U8A	Vert. Osc. - Vert. Output	6U8A ①
V5	Video Output	12BY7A	Horiz. AFC - Horiz. Osc.	6GH8
V6	AGC Keying-Sync Phase Inv.	6AN8	Horiz. Output	6DQ6B
V7	Audio Det.	6BN6	Damper	6AX4GTB
V8	HV Rectifier	1B3GT	HV Rectifier	1G3GT/1B3GT (1G3GT)*
V15	LV Rectifier			5U4GB ③

① Chassis #6 uses 6C4 as Vert. Osc. Tube.
② Chassis #6 uses 6SN7 as Vert. Output Tube.
* Alternate
③ Chassis #6 uses 5V3 in this application.

PICTURE TUBE

ITEM No.	REPLACEMENT DATA					NOTES
	Curtis Mathes PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
V16	21CBP4A ‡ 23T24 21DEP4A	21CBP4A *	21CBP4/21CBP4A	21CBP4/21CBP4A†	21CBP4A † 21DEP4A †	* Aluminized † Silver Screen "25"
		21DEP4 *	21DEP4A/21DEP4/ 21CEP4 *	21DEP4A *	21DEP4A †	
		23CP4 ‡	23CP4 *		23CP4 †	

‡ Used in Models 156-21, 166-21, 176-21, 186-21 (Ch. 6).
§ Used in Models 96-23, 106-23 (Ch. 6).

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Curtis Mathes PART No.	ALLIED PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	80	350	4A27	AF23-443-80	BG330		CPZ27.6	TMD-40	TVL-2835
B	40	350			BR4018		CPZ40	TVD-40-350	TVA-1413
C	440	50							
C2A	450	350	4A36	AF24-58-70	CG360		FP43L4	TMQ-53	TVL-4787, §
B	10	450			BR4405				
C	430	350							
D	40	50							
C3	4	50	4A19	PR24-00	BBR4-50	TT50X4	TD-4-50	TVA-1402	

FIXED CAPACITORS

Capacity values given in the rating columns are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REMARKS	REPLACEMENT DATA					
				ALLIED PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	.47	200V		P488N-47	CUS2P47	2DP-S-474	GEM-2047	2TM-P47	
C5	.33	200V		P488N-33	CUS2P33	2DP-S-334	GEM-2033	2TM-P33	
C6	18	NPO		NPO-SI 18	TCZ-18	CG4QSC	CCTO-180	CMO-418	10TCC-Q18
C7	9	NPO	± .5mmf	NPO-DI 9	TCZ-9	CG4QC	CCTO-090	CMO-409	10TCC-Q09
C8	9	NPO	± .5mmf	NPO-DI 9	DTZ-9	CG4QC	CCTO-090	CMO-409	10TCC-Q09
C9	47	NPO	10%	NPO-DI 47	DTZ-47	CG4QC	CCTO-470	CMO-447	10TCC-Q47
C10	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C11	680			BP2-0068	DD-681	BY40T6S	CCD-681	B-368	10TB-T68
C12	56	NPO			TCZ-56	CG4QSC	CCTO-560	CMO-456	10TCC-Q56
C13	470			BP2-0047	DD-471	BY40T47	CCD-471	B-347	10TB-T47
C14	680			BP2-0068	DD-681	BY40T68	CCD-681	B-368	10TB-T68
C15	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C16	680			BP2-0068	DD-681	BY40T68	CCD-681	B-368	10TB-T68
C17	680	NPO		BP2-0068	DTZ-68	CG4QSC	CCTO-680	CMO-468	10TCC-Q68
C18	680			BP2-0068	DD-681	BY40T68	CCD-681	B-368	10TB-T68
C19	470			BP2-0047	DD-471	BY40T47	CCD-471	B-347	10TB-T47
C20	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C21	100	NPO	10%	NPO-SI 100	CDZ1C	CC70-101	CMO-410	10TCC-T10	
C22	1000	NPO			TCZ-1000	CG4QSU	CCTO-102	CMO-435	10TCC-Q35
C23	.047	400V		P488N-047	DD-503	CUS4S47	4DP-S-473	GEM-4147	4TM-S47
C24	.047	400V		P488N-047	DD-503	CUS4S47	4DP-S-473	GEM-4147	4TM-P1
C25	.1	200V		BP488N-1	DF-104	CUS1P1	2DP-S-104	GEM-201	2TM-P1
C26	.047	600V		P688N-033	DD-333	CUS6S33	6DP-S-333	GEM-6133	6TM-S33
C27	.047	600V		P688N-047	DD-503	CUS6S47	6DP-S-473	GEM-6147	6TM-S47
C28	.033	200V		P288N-33		CUS2P33	2DP-S-334	GEM-6033	6TM-P33
C29	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C30	8.5	NPO	1%	NPO-DI 8.5	DTZ-8R5	CG4QSC	CCTO-8R5	CMO-438	10TCC-Y85
C31	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C32	1000			C6-6000		PM6DS	JL-250	5TS-D60	5TS-D60
C33	100	NPO	10%	NPO-SI 100	TCZ-100	CG2TC	CCTO-101	CMO-310	10TCC-T10
C34	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C35A	1000			BP2-1X001	DD2-102	BYDD2DS	CCD-102	B2X210	5SK-DXD0
B	1000						CCD-102		
C36	6000			BP2-005	DD-503	BY40S26	CCD-502	B-250	5SK-D50
C37	15			1455-000015	DTZ-150	EZS5G15	CM-150B-150J	MS-415	5SK-D50
C38	4700			BP2-0047	DD-472	BY40S47M	CCD-472	B-347	5SK-D47
C39	470			BP2-0047	DD-471	BY40T47	CCD-471	B-347	10TB-T47
C40	4700			BP2-0047	DD-472	BY40S47M	CCD-472	B-347	5SK-D47
C41	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C43	33	200V		P288N-33		CUS2P33	2DP-S-334	GEM-2033	2TM-P33
C44	5000	10%		C1-5000		PM6DS	CCD-502	JL-250	5TS-D50
C45	5000	10%		D1-5000		PM6DS	CCD-502	JL-250	5TS-D50
C46	.047	400V		P488N-047	DD-503	CUS4S47	4DP-S-473	GEM-4147	4TM-S47
C47	.047	400V		P488N-047	DD-503	CUS4S47	4DP-S-473	GEM-4147	4TM-S47
C48	.01	400V		P488N-01	DS-103	CUS4S	4DP-I-103	GEM-411	4TM-S1
C49	.01	400V		P488N-01	DD-103	CUS4S	4DP-I-103	GEM-411	4TM-S1
C50	.047	400V	10%	Y84C4S47-10%			4DP-S-473	GEM-1615	4TM-S47
C51	.047	400V	10%	Y84C4S47-10%			P84S47	4DP-S-473	GEM-1615	4TM-S47
C52	.047	400V	10%	Y84C4S47-10%			P84S47	4DP-S-473	GEM-1615	4TM-S47
C53	.1	600V		P688N-1	DF-104		CUS6P1	6DP-S-104	GEM-601	6TM-P1
C54	56	NPO			TCZ-56	CG4QSC	CCTO-560	CMO-456	10TCC-Q56
C55	56	NPO			TCZ-56	CG4QSC	CCTO-560	CMO-456	10TCC-Q56
C56	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C57	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C58	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C59	1000	300V		P388N-033	DD-333	CUS3S33	3DP-S-334	GEM-6133	6TM-S33
C60	470			BP2-0047	DD-471	BY40T47	CCD-471	B-347	10TB-T47

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R43	4700	
R44	390K	
R45	33K	
R46	33K	
R47	2200Ω	
R48	680Ω	
R49	330K	
R50	470Ω	
R51	120K	
R52	33K	
R53	39K	
R54	470Ω 1W	
R55	270K	
R56	47K	
R57	2.7meg	
R58	270K	
R59	2.7K 1W	
R60	2.7meg	
R61	470Ω	
R62	680Ω	
R63	470K	
R64	390K	
R65	22K	
R66	2.5meg	
R67	100Ω	
R68	680Ω 1W	
R69	680K	
R70	470K	
R71	39K	
R72	39K	
R73	2200Ω	

ITEM No.	RATING	REMARKS
R74	680Ω	220Ω *
R75	560Ω	220Ω *
R76	680Ω	
R77	100K	
R78	100K	
R79	330K	
R80	330K	
R81	1meg	
R82	120K	
R83	100K	
R84	100K	
R85	1meg	
R86	47K	
R87	1K	
R88	130K 1W	
R89	1meg	
R90	1meg	
R91	680Ω	
R92	8200Ω 2W	
R93	100Ω 2W	
R94	4700Ω	
R95	47K	
R96	22K	
R97	.56Ω	
R98	120K	
R99	39000	
R100	56000	
R101	10000 5W	#6A17
R102	100K 2W	
R103	270K	

* Alternate Value.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Curtis Mathes PART No.	REPLACEMENT DATA	
XG	Sync Sep. Grid	150mmf, 370K			
X3	Vert. Integrator	2000mmf, 5000mmf, 5000mmf, 8200Ω, 220Ω, 22K		Aerovox	PA-110
				Centralab	PC-100
				Cornell-Dubilier	UU2M1
				Mallory	M6-100
				Sprague	V-J/V-3

FIXED CAPACITORS (cont)

ITEM No.	RATING		REMARKS	REPLACEMENT DATA					
				ALLIED PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	FLAMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C80	.047	400V		P488N-047	DD-503	CUS4S47	4DP-S-473	GEM-4147	4TM-S47
C81	680	10%		BP2-0068	DD-681	BR3756	CCD-681	GP368	10TB-T68
C82	1500	10%		1454-0015		1R5D15	CM-19B-152K	MCB456	M6-215
C83	2200	10%		1454-0022		1R5D26	CM-19B-222K	MCE459	M6-222
C84	470			BP2-0047	DD-471	BY40T47	CCD-471	B-347	10TB-T47
C85	1500	10%		D1-1500	DD-152	PM6DS	CCD-152	GP5S	10TB-D65
C86	6000		#3AS	BP2-001	DD-102	BY40S6	CCD-102	B-210	5SK-DD0
C87	170-700							480	
C88	.047	400V		P488N-047	DD-503	CUS4S47	4DP-S-473	GEM-4147	4TM-S47
C89	1000			BP2-001	DD-102	BY40SX	CCD-102	B-210	5SK-DD0
C70	.22	600V		P688N-22		CUS6P22	6DP-S-224	GEM-6122	6TM-P22
C71	.1	600V		P688N-1	DF-104	CUS6P1	6DP-S-104	GEM-601	6TM-P1

‡ Curtis Mathes Part Number.

CONTROLS

ITEM No.	RATING		Curtis Mathes PART No.	REPLACEMENT DATA				INSTALLATION NOTES
	RESIST-ANCE	WATTS		CENTRALAB PART No.	CLAROSTAT PART No.	CTS—IRC PART No.	MALLORY PART No.	
R1A	1meg	½	2A39			B13-137X	PR67Z35	Volume
B	500K Tap							
C	Shaft						D6-37	
	Switch					Not Reg.	Not Reg.	Push-Push, Off-On
R2A	3meg	½	2A36	AB-8S	A47-3meg-Z	B13-140	D8-37	Shaft
B	3meg			AK-8	RB-3/16	SK9	D8-37	
R3A	1meg	½	2A35	AB-7S	A47-1meg-Z	B13-137	D8-37	Treble
B	Shaft			AK-8	RB-3/16	SK9	D8-37	
R4A	750Ω	½	2A33	F1-3				Contrast
B	500K			R3-40				Brightness
R5A	1meg	½	2A32	AB-8S	A47-1meg-S	B13-137	D8-37	Horiz. Hold
B	Shaft			AK-8	RB-3/16	SK9	D8-37	
R6A	500	½	2A31	AB-3S	A47-500-S	B13-135	D8-37	Vert. Hold
B	Shaft			AK-8	RB-3/16	SK9	D8-37	
R7A	3.5meg	½	2A30	AB-8S	B47-3.5meg-S	ELC-2	B01-S05	Sync Stability
B	Shaft			AK-1	Not Reg.	Not Reg.	Not Reg.	
R8A	2.5meg	½	2A38	AB-8S	B47-2.5meg-S	ELC-2	B01-S05	Height
B	Shaft			AK-1	Not Reg.	Not Reg.	Not Reg.	
R9A	2.5meg	½	2A37	AB-8S	B47-2.5meg-S	ELC-2	B01S05	Range (AGC)
B	Shaft			AK-1	Not Reg.	Not Reg.	Not Reg.	
R10A	1500Ω	½	2A16	AB-8	A47-1500S	B11-109	B1-09	Vert. Linearity Note 1
B	Shaft			AK-1	Not Reg.	TM4	Not Reg.	
R10A	50K	½	2A34	AB-3S	B47-50K-S	B11-133	B1-33	Vert. Linearity Note 2
B	Shaft			AK-1	Not Reg.	TM4	Not Reg.	
R11	500Ω	2(WW)	8A11		39-500	113-500	FL-500	Buzz Control

† "Concentrikit" Equivalent: K-15 Kit with base elements and shafts: B11-105, P17-02S (Panel)
* "TA-LOC" Equivalent: FA7SIL, R19S1, FA7SIL, B11-133, R1-05S (Rear)
Note 1. Used in Chassis #6. Note 2. Used in Chassis #6.

COILS (RF-LF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Curtis Mathes PART No.	Gramer PART No.	Heinemn PART No.	Merit PART No.	Miller PART No.	Rem PART No.	
L2	47.25MC Trap	LA13	17-4535 *	17-4535 *	TV-153 *			
L3	39.75MC Trap	LA13	17-4535 *	17-4535 *	TV-151	6235		
L3	1st Video IF	LA13	17-4535 *	17-4535 *	TV-151	6235		
L4A	2nd Video IF	LA39	17-4536	17-4536		6233		
B	47.25MC Trap							
L5A	3rd Video IF	LA40	17-4535	17-4535		6232		
B	41.25MC Trap							
L5A	4th Video IF	LA18 ①						
B	RF Choke							
L7	Series Peaking Coil	LA19	19-3036	19-3036	TV-180	6176	VP-1	30uh
L8	Shunt Peaking Coil	LA1	19-3160	19-3160	TV-194	6180	VP-3	190uh
L9	4.5MC Trap	LA17	20-1004	20-1004	TV-151	1470	SP-3	
L10	Shunt Peaking Coil	LA3 ②	19-3036 ↓	19-3036 ▲	TV-180 ▲	6176 ▲	VP-1 ▲	30uh
L11	Shunt Peaking Coil	LA3 ③	19-3100 †	19-3100 †	TV-194 †	6115 †	VP-3 †	105uh
L12	Shunt Peaking Coil	LA4 ④	19-3180 ↓	19-3180 ▲	TV-194 ▲	6180 ▲	VP-3 ▲	190uh
L13	1st Sound IF	LA18	17-4026	17-4026	TV-154	1470-A	SD-5	
L14	2nd Sound IF	LA18	17-3495	17-3495	TV-153	6303	SP-3	
L15	Quadrature Coil	LA33	20-1005	20-1005	TV-151	1480	SP-3	
L16	Ratio Coil	LA33	19-1001	RC-502	6804		VP-3	1.5ch

① Complete Assembly.
② Wound on 18050i Resistor.
③ Wound on 3900i Resistor.
④ Wound on 6800i Resistor.
* Disregard Tap.
▲ Parallel with 18050i Resistor.
† Parallel with 3900i Resistor.
‡ Parallel with 6800i Resistor.

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA								
		Curtis Mathes PART No.	Halldorson PART No.	Merit PART No.	Miller PART No.	Rem PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L17	Horiz. Osc. Coil	LA37 ①	HS-8	TV-188	6234				HS-8	

① Alternate Part #A41.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA							
	CURRENT (Measured)	DC RES	INDUCTANCE @ CURRENT 1000 ^1/2	Curtis Mathes PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
L18	.320A	50Ω	1.8 Hy.	10A18	25C93 ↓	C-2996 ↓	F-801 ↓	C-2326 ↓	25C93 ↓	C-34X	

① Drill new mounting hole.

TRANSFORMER (POWER)

ITEM No.	RATING		REPLACEMENT DATA						
	PRI.	SEC. 1 SEC. 2 SEC. 3	Curtis Mathes PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ① 1.8A	560 VCT/ 6V ② .280A ③ 3A	12A8-3B ④						R-8BC ①③
	SEC. 3 4. 3V 5. 6.6A	SEC. 4 SEC. 5							

① Use MB30 Kit for mounting. ② Tape 1.2A (6.3V) winding. Phase and parallel 6A (6.3V) windings.
③ Alternate Part #12A8-3.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA								
		Curtis Mathes PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	Vert. Osc.	10A11-1 ①	28A03	A-3003	V605	VBO-15	A-3111	28A03	A-97X	
T3	Vert. Output	10A11 ②	28A03	A-3006	V606	VBO-19	VBO-201	28A03	A-122X	
T3	Vert. Output Alt. Vert. Output	10A14 ③ 10A14-1 ③	28S73	A-2954	V307 ③	V024 ③	VO-105 ③	28S73	A-118X ③	
T4	Vert. Output	10A9-1 ④								
T4	Yoke Horiz. (21MB) 90° Vert. (21MB) Alt. Yoke	LA30-1 ⑤	MDF-92 ⑤ ⑥	T90F10/43 ⑤ ⑥	PCM2045 ⑤ ⑥	DY-18A ⑤ ⑥		Y-18 ⑤ ⑥	Y-43 & YW2 ⑥	
T5	Horiz. Output	LA42-1 ⑦ LA31-1 ⑦ LA38 ⑦ ⑧	FLY150 ⑦	HVD-16 ⑦	X167 * ⑦		HO-283 ⑦	FLY-150 ⑦	D-160 *	

① Used in Chassis #6.
② Used in Chassis #5.
③ Connect as Autoformer.
④ Drill for mounting holes).
⑤ Use original rear cover and centering device.
⑥ Connect yoke terminals #3 to plug #6; yoke #2 & #7 to plug #5; yoke #4 to plug #2; yoke #4 to plug #8; yoke #6 to plug #7.
⑦ Remove resistor R94 from circuit. Install new horizontal damping network, consisting of approximate 10000 resistor and 33mmf capacitor ② 2KC across horizontal yoke terminals #3 & #6.
⑧ Cut and tape red/black lead.
* Connect same as original.

†HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Rem Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
8	5	5	5	5	5	5	5
6	4	4	4	4	4	4	4
5	7	3	3	3	3	3	3
3	N.C. See Note ①	N.C. See Note ①	N.C. See Note ①	N.C. See Note ①	N.C. See Note ①	N.C. See Note ①	7
1	1	1	1	1	1	1	1

CURTIS MATHES MODELS 95-23, 96-23, 105-23, 106-23, 155-21, 156-21, 165-21, 166-21, 175-21, 176-21, 185-21, 186-21 (Ch. 5, 6)

FOLDER 1

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Curtis Mathes PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T6	5200Ω	6-8Ω	10A10	24S92	A-2902①	AU-609	A-2313	24S92	S-55X	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Curtis Mathes PART No.	QUAM PART No.	
SP1	8"	PM	6-8Ω	W8EV39	8A21Z8	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	Curtis Mathes PART No.	ITT PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1			KI616				Dual Diode

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Curtis Mathes PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	N	4/10A 250V S/B			333.400 (N 4/10A 250V S/B)	346009	N 4/10	HN 3/10 to 1/2
M3	1 3/4"	length of #26 wire						

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Curtis Mathes PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M4	1N60		1N60	1N60	1N60	Video Detector

MISCELLANEOUS

ITEM No.	PART NAME	Curtis Mathes PART No.	NOTES
M5	Tuner	7A2	VHF Complete, STANDARD COIL REPLACEMENT PART #GG-4220A

CABINETS & CABINET PARTS

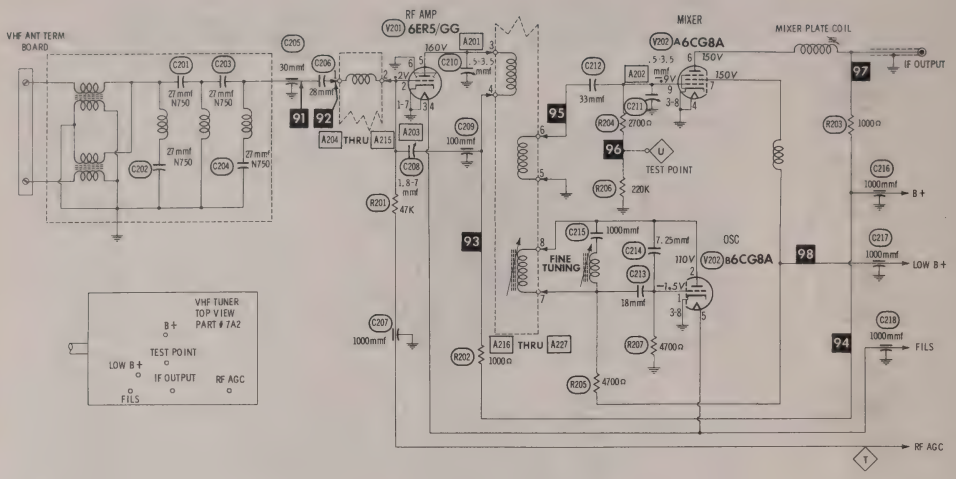
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	11B8-3	Channel Selector
Knob	11B9	Fine Tuning
Knob	11B7-1	Volume, Brightness
Knob	11B6-1	Contrast
Knob	11B10	Vertical Hold, Horizontal Hold, Tone

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8484 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor

CHASSIS - TOP VIEW



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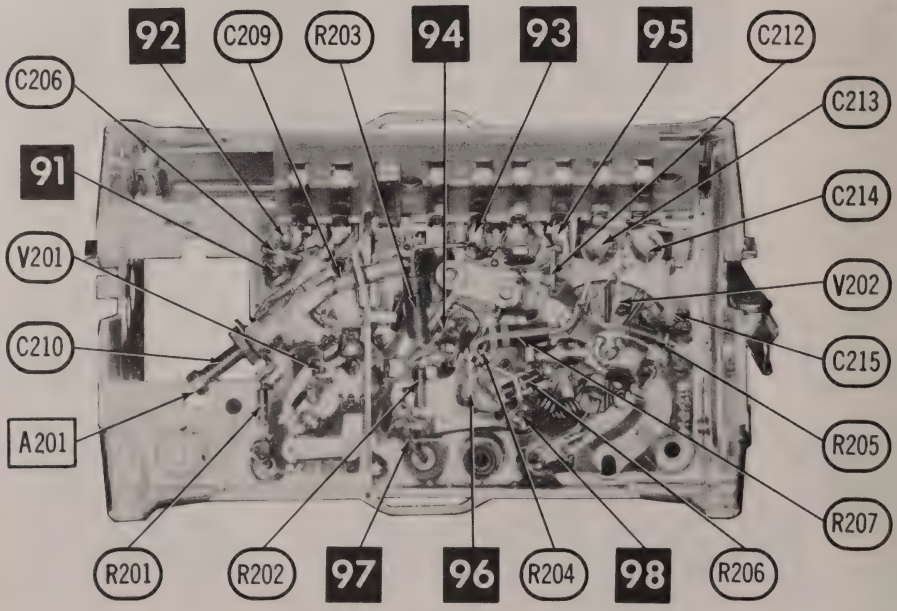
TUNER 7A2



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ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

TUNER 7A2 - BOTTOM VIEW

TUNER PARTS LIST AND DESCRIPTIONS

TUBES

• CBS •	GENERAL ELECTRIC •	RAYTHEON •	SYLVANIA •

ITEM No.	USE	TYPE
V201	RF Amp.	6ER5/GG

ITEM No.	USE	TYPE
V202	Mixer - Osc.	6CG8A

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	27 N750		N750-25	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C202	27 N750		N750-25	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C203	27 N750		N750-25	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C204	27 N750		N750-25	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C205	30							
C206	28			TCZ-27	C10Q27C	CCTO-270	CNO-428	10TCC-Q27
C207	1000		EF-001	MFT-1000		CCF-102	CT280A	
C208	1.8-7			829-7				
C209	100		EF-0001	MFT-100				
C210	.5-3.5							
C211	.5-3.5							
C212	33		NPO-DI 33	DTZ-33	C10Q33C	CCTO-330	CNO-433	10TCC-Q33
C213	18		NPO-DI 20	TCZ-18	C10Q18C	CCTO-180	CNO-418	10TCC-Q18
C214	7.25				C10V7C			
C215	1000		BPD-01	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C216	1000		EF-001	MFT-1000		CCF-102	CT280A	
C217	1000		EF-001	MFT-1000		CCF-102	CT280A	
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	

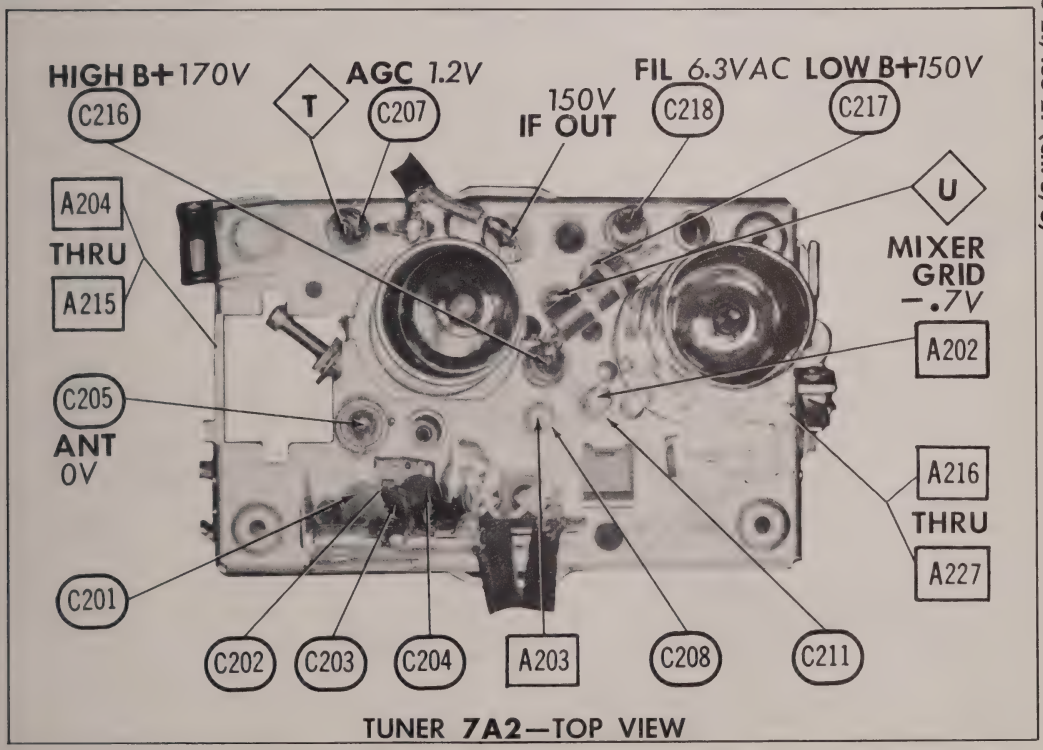
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R201	47K 1/4W	
R202	1000Ω 1/4W	
R203	1000Ω	

ITEM No.	RATING	REMARKS
R204	2700Ω 1/4W	
R205	4700Ω 1/4W	
R206	220K 1/4W	

ITEM No.	RATING	REMARKS
R207	4700Ω	



TUNER **7A2**—TOP VIEW

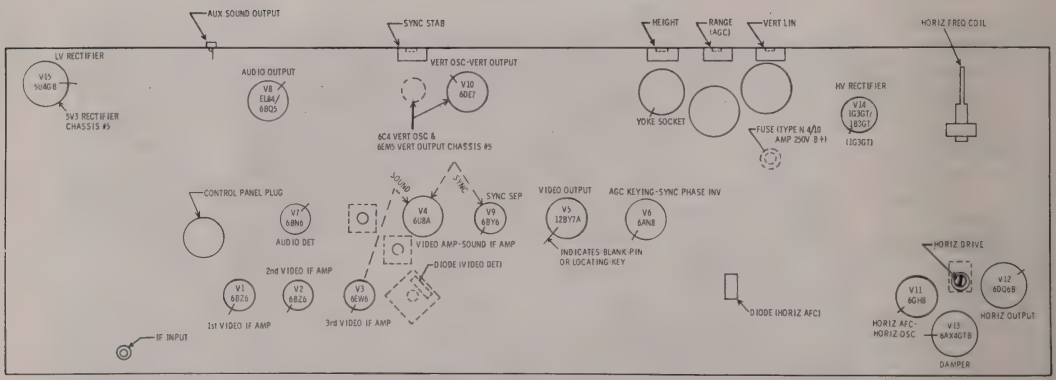
CURTIS MATHES MODELS 95-23, 96-23, 105-23, 106-23, 155-21, 156-21, 165-21, 166-21, 175-21, 176-21, 185-21, 186-21 (Ch. 5, 6)

FOLDER 1

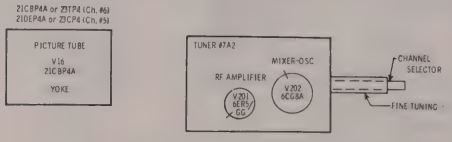
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	105K	47Ω	.1Ω	0Ω	†2900Ω	†2900Ω	0Ω		
V2	6BZ6	100K	47Ω	.1Ω	0Ω	†2900Ω	†2900Ω	0Ω		
V3	6EW6	.1Ω	180Ω	0Ω	.1Ω	†8200Ω	†8200Ω	0Ω		
V4	6U8A	†8500Ω	6Ω	†25K	.1Ω	0Ω	†25K	2200Ω	1.5Ω	3900Ω
V5	12BY7A	• 120Ω	• 1meg	0Ω	0Ω	0Ω	.1Ω	†3600Ω	†1900Ω	0Ω
V6	6AN8	†6600Ω	†1meg	6800Ω	0Ω	.1Ω	430K	†50Ω	†40K	†1900Ω
V7	6BN6	• 210Ω	3.5Ω	.1Ω	0Ω	†6600Ω	6Ω	†330K		
V8	EL84/ 6BQ5	NC	10K	390Ω	.1Ω	0Ω	NC	†1100Ω	NC	†520Ω
V9	6BY6	•†300K	0Ω	0Ω	.1Ω	†820K	†29K	2.2meg		
V10	6DE7	†360Ω	2.2meg	NC	.1Ω	0Ω	• †700K	• 1.1meg	220Ω	•1200Ω
V11	6GH8	• †120K	100K	†47K	0Ω	.1Ω	†120K	105Ω	0Ω	1.6meg
V12	6DQ6B	NC	.1Ω	NC	†8200Ω	1meg	NC	0Ω	100Ω	TOP CAP †16Ω
V13	6AX4GTB	NC	TP	¶	NC	†50Ω	NC	.1Ω	0Ω	
V14	1G3GT/ 1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †315Ω
V15	5U4GB	NC	¶	NC	26Ω	NC	24Ω	NC	¶	
V16	21CBP4A	0Ω	1meg	Pin 6 †100K	Pin 10 †12meg	Pin 11 •85K	Pin 12 .1Ω			
V201	6ER5/GG	0Ω	1.2meg	0Ω	.1Ω	†4900Ω	0Ω	0Ω		
V202	6CG8A	4700Ω	†14K	0Ω	0Ω	.1Ω	†4900Ω	†9500Ω	0Ω	223K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

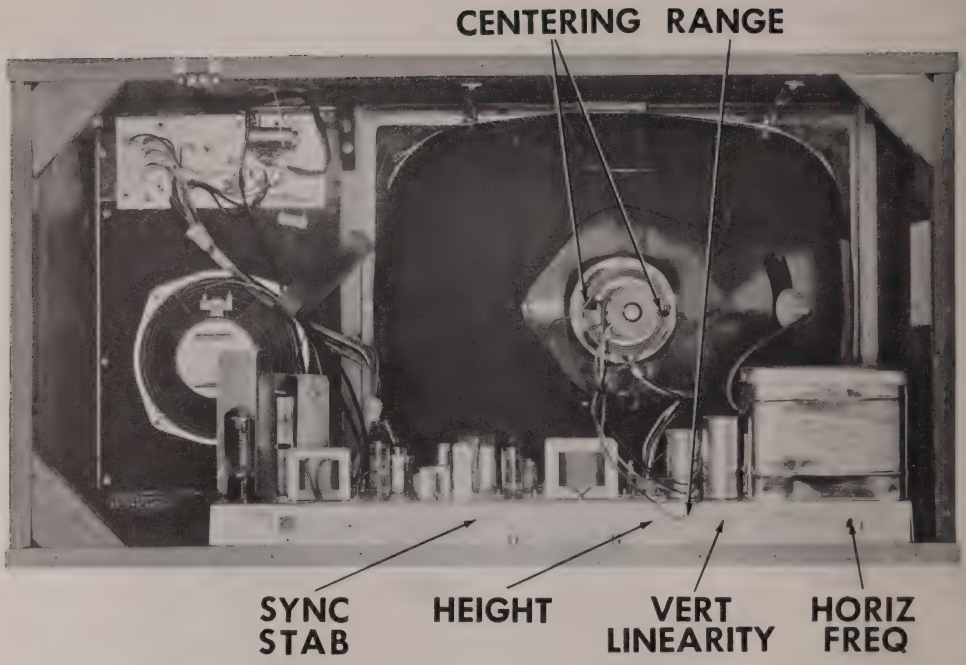
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM PIN 3 OF V13.
† MEASURED FROM PIN 8 OF V15.
NC NO CONNECTION
TP TIE POINT



BOTTOM VIEW



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV signal, preferably with a test pattern. Set Horizontal Hold to center of its range. Adjust the Horizontal Frequency slug (B1) until picture synchronizes horizontally. Turn Contrast counterclockwise and Brightness clockwise until picture appears washed out. Turn Horizontal Drive trimmer (B2) clockwise until white vertical bar(s) (drive lines) appear in the left center portion of the raster, then counterclockwise until drive lines just disappear.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL 156-21

1. Remove 17 wood screws holding rear cover. Remove rear cover.
2. Remove picture tube socket, yoke plug, high voltage lead, speaker leads, tuner plug, and plug from switch panel.
3. Remove 5 chassis bolts.
4. Remove chassis.

VHF TUNER REMOVAL

1. Remove 9 push-on type knobs (including channel selector) in front of cabinet.
2. Remove 4 screws holding tuner bracket.
3. Remove tuner.

PICTURE TUBE REMOVAL

1. It is necessary to remove chassis for picture tube removal. (See step 1 thru 4 of "Chassis Removal".)
2. Remove 4 screws at top of cabinet and 2 nuts at bottom of cabinet holding picture tube mounting bracket.
3. Remove picture tube.

PHOTOFACT® Folder with CIRCUITRACE®

EMERSON MODELS 1524, 1525, 1526, 1527 (Ch. 120507A, 120508B)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

EMERSON MODELS 1524, 1525, 1526, 1527 (Ch. 120507A, 120508B)

EMERSON MODELS 1524, 1525, 1526, 1527 (Ch. 120507A, 120508B)

MODEL 1524 (CH. 120507A)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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EMERSON MODELS 1524, 1525, 1526, 1527 (Ch. 120507A, 120508B)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL 1524

1. Remove 5 push-on type knobs at front of cabinet.
2. Remove 6 metal screws holding rear cover. Remove rear cover.
3. Remove picture tube socket, yoke, speaker leads, and high voltage lead.
4. Remove 6 chassis bolts.
5. Remove lower chassis.
6. Remove 3 screws at side of cabinet holding the printed board.
7. Remove printed board.

PICTURE TUBE REMOVAL

1. Remove 4 push-on type knobs.
2. Remove rear cover.
3. Remove picture tube socket, yoke, and high voltage lead.
4. Remove 6 screws in front holding cabinet front. Remove cabinet front (containing picture tube mounting).
5. Remove picture tube.

MODEL 1524 (CH. 120507A)

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

TRADE NAME	EMERSON	MODELS	CHASSIS
		1524, 1526	120507A
		1525, 1527	120508B
MANUFACTURER	Emerson Radio & Phonograph Corp., 524 W. 23rd St., New York 11, N. Y.		
TYPE SET	Television Receiver		
TUBES	VHF - Sixteen, UHF - Seventeen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 110 Watts, 1.1 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 3 screws from bottom of front. Pull bottom of front out and up to remove.

FUSE

A 1 1/4 Amp S/B fuse is used for low voltage supply protection. (For location, see "Tube Placement Chart".)

FUSE DEVICE

A 1Ω fusible resistor is used for filament protection. (For location, See R86 on Printed Board Photo).

TUNER OSCILLATOR ADJUSTMENT

To touch up the VHF Oscillator, remove Channel Selector and Fine Tuning Knobs.

AGC

The AGC may be varied by means of two switches for Fringe - Local - Normal positions.

FOCUS

No provision is made to vary the focus on this receiver.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Coarse adjustment of the Horizontal Hold is accomplished by the proper setting of the Horizontal Frequency Slug. (For location, See L16 on Printed Board Photo).

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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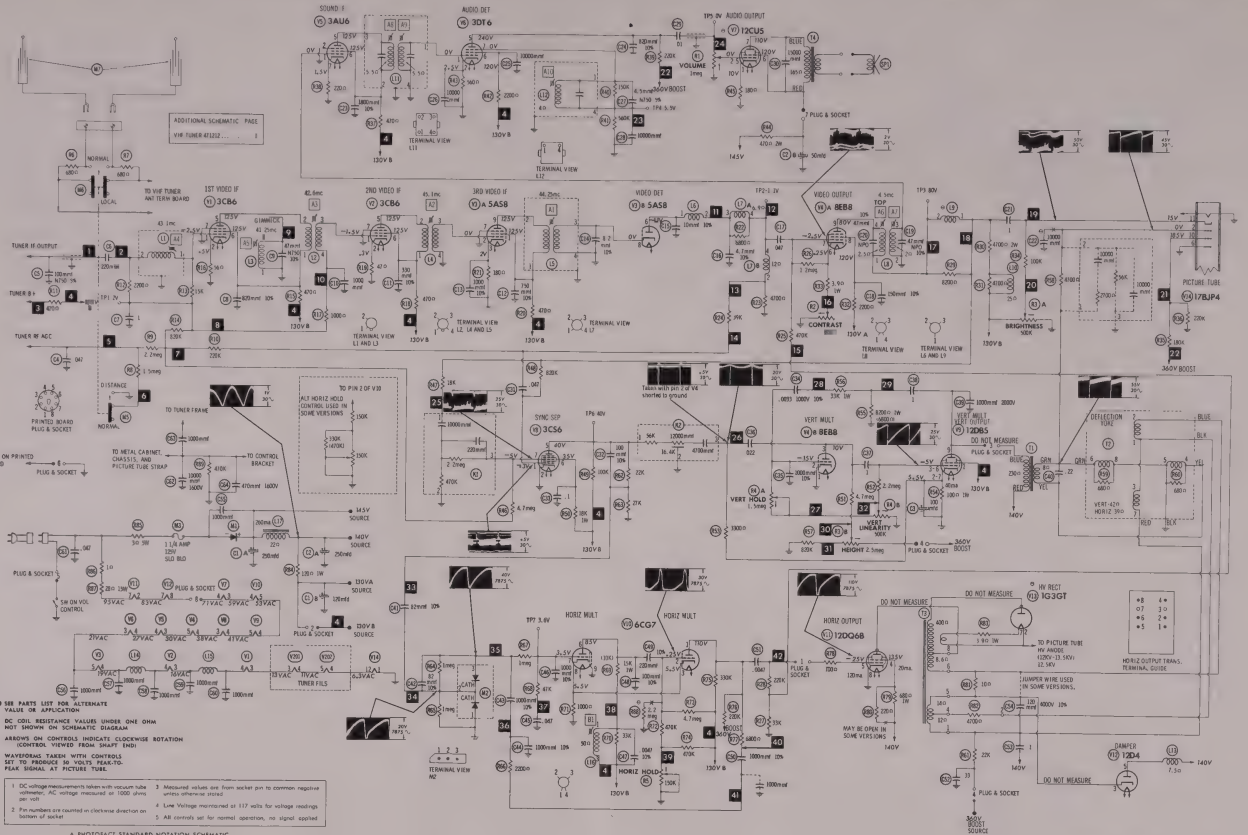
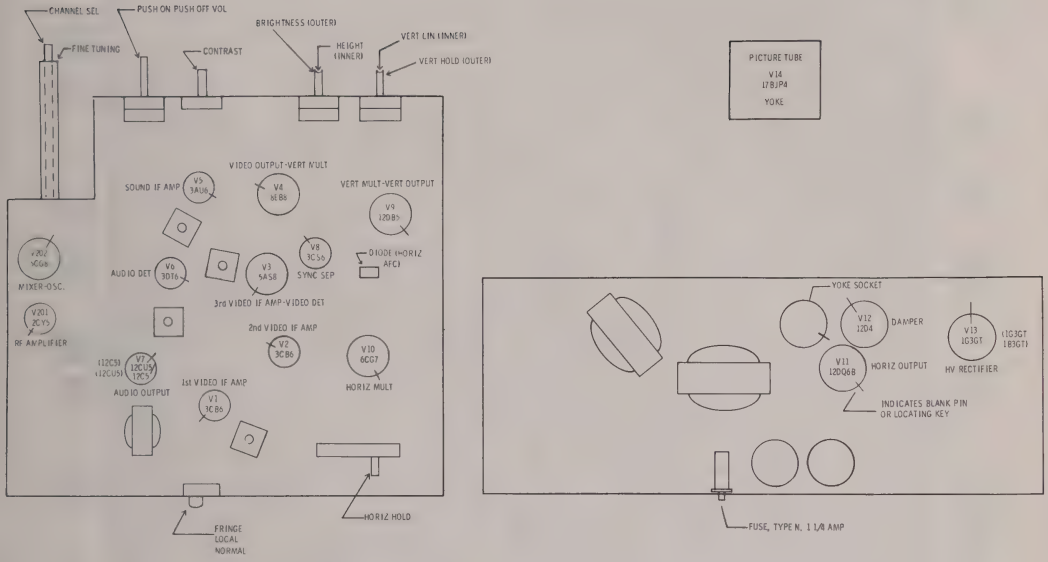


EMERSON MODELS 1524, 1525, 1526, 1527 (Ch. 120507A, 120508B)

FOLDER 2

TUBE PLACEMENT CHART

TOP VIEW



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

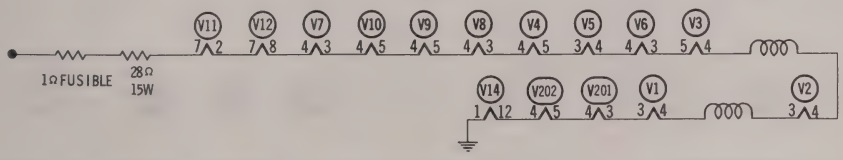
POWER SUPPLY FAILURE
No raster, no sound Fuse (Line), Rectifier (B+), Fusible Resistor (Fil.)

SWEEP FAILURE
No raster, has sound V10, V11, V12, V13, V14
No vertical deflection V4, V9
Poor vert. linearity or foldover V4, V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, Rectifier (B+)
Vert. off freq. V4
Horiz. off freq. Diode (AFC), V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V14
Has pic, no sound V5, V6, V7

SYNC FAILURE
No vert. sync V8
No horiz. sync V8
No vert. or horiz. sync V8

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



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PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough generator output to provide a usable indication.
Connect the negative lead of a 3 volt bias supply to point TP-1. Positive to chassis.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Place a thin insulated metal strip between the Mixer-Osc. tube and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	Not used	44.25MC (Unmod.)	Any non-interfering channel	Use VTVM DC probe thru 10K to TP-2. Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	45.1MC	"	"	A2	"
3.	"	"	42.6MC	"	"	A3	"
4.	"	"	43.1MC	"	"	A4	"
5.	"	"	41.25MC	"	"	A5	Adjust for MINIMUM deflection.
6.	"	44.0MC (10MC Swp.)	45.75MC	"	Vert. Amp. thru 20K to TP-2. Low side to chassis.	Mixer Plate Coil	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.

4.5MC TRAP ALIGNMENT

Tune in a strong TV signal and set Contrast at maximum. Adjust the Fine Tuning until a beat pattern is visible. Adjust A6 for MINIMUM beat interference.

SOUND IF ALIGNMENT

Tune in a strong TV signal and adjust A7, A8 and A9 for loudest sound. Adjust A10 for clearest and loudest sound. If two peaks occur, peak with slug nearest chassis.
Disconnect antenna lead and loosely couple to obtain a weak signal and repeat adjustment of A7, A8 and A9 tuning for maximum sound and MINIMUM distortion.
Check the voltage at TP-4 using a VTVM. It should measure between -4 and -9 volts and should not vary more than two volts between a strong signal and a weak one.
Check sound on all available channels and repeat entire procedure, if necessary.

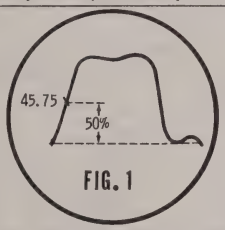
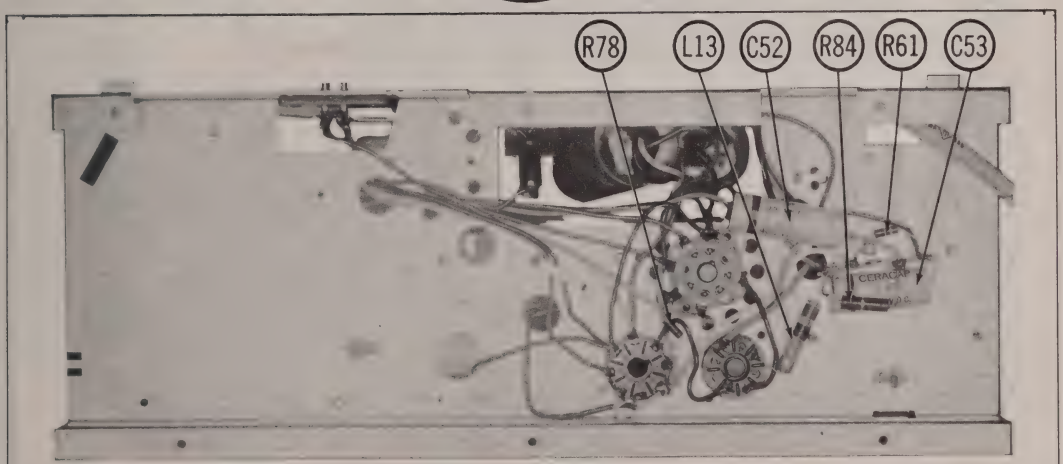
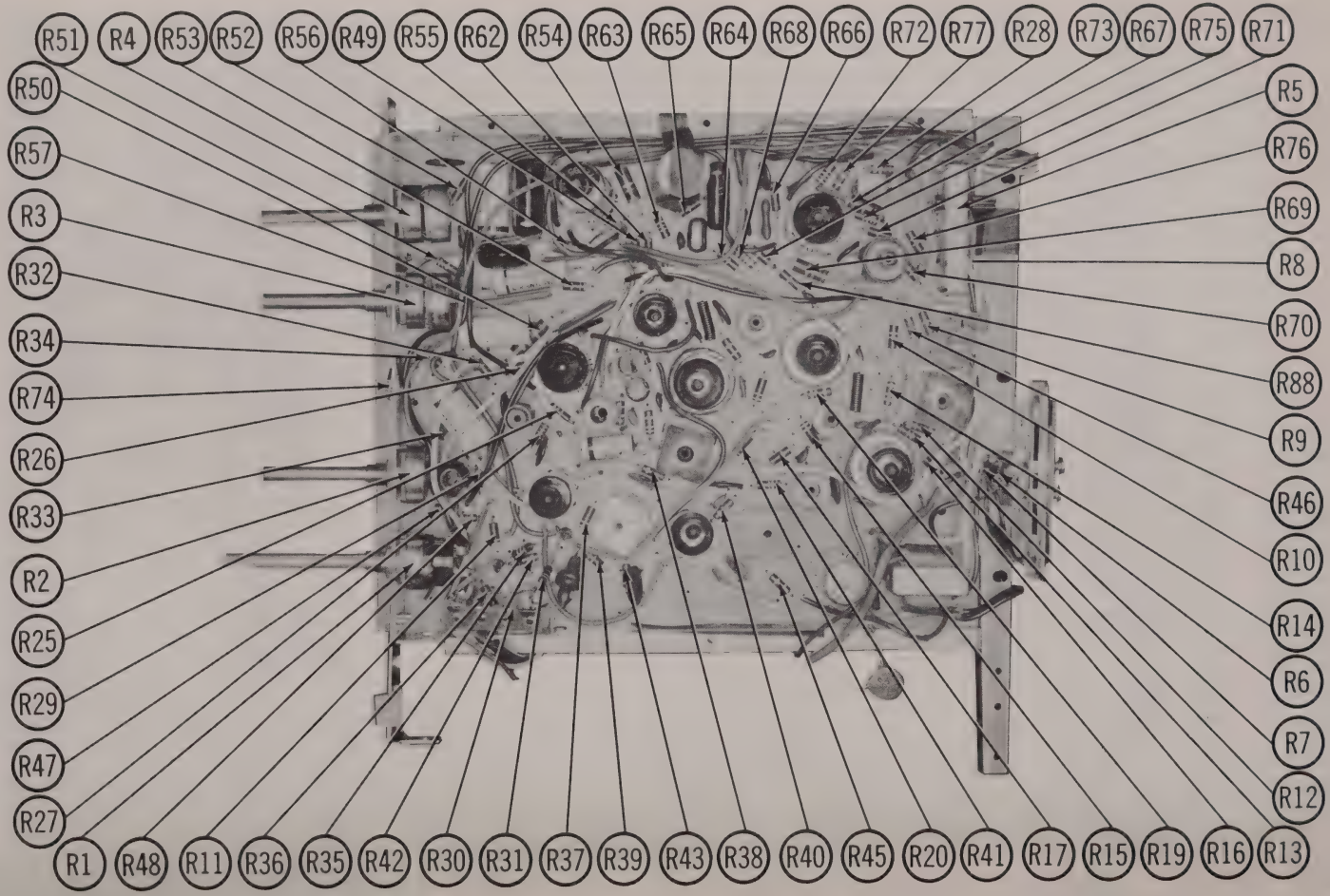


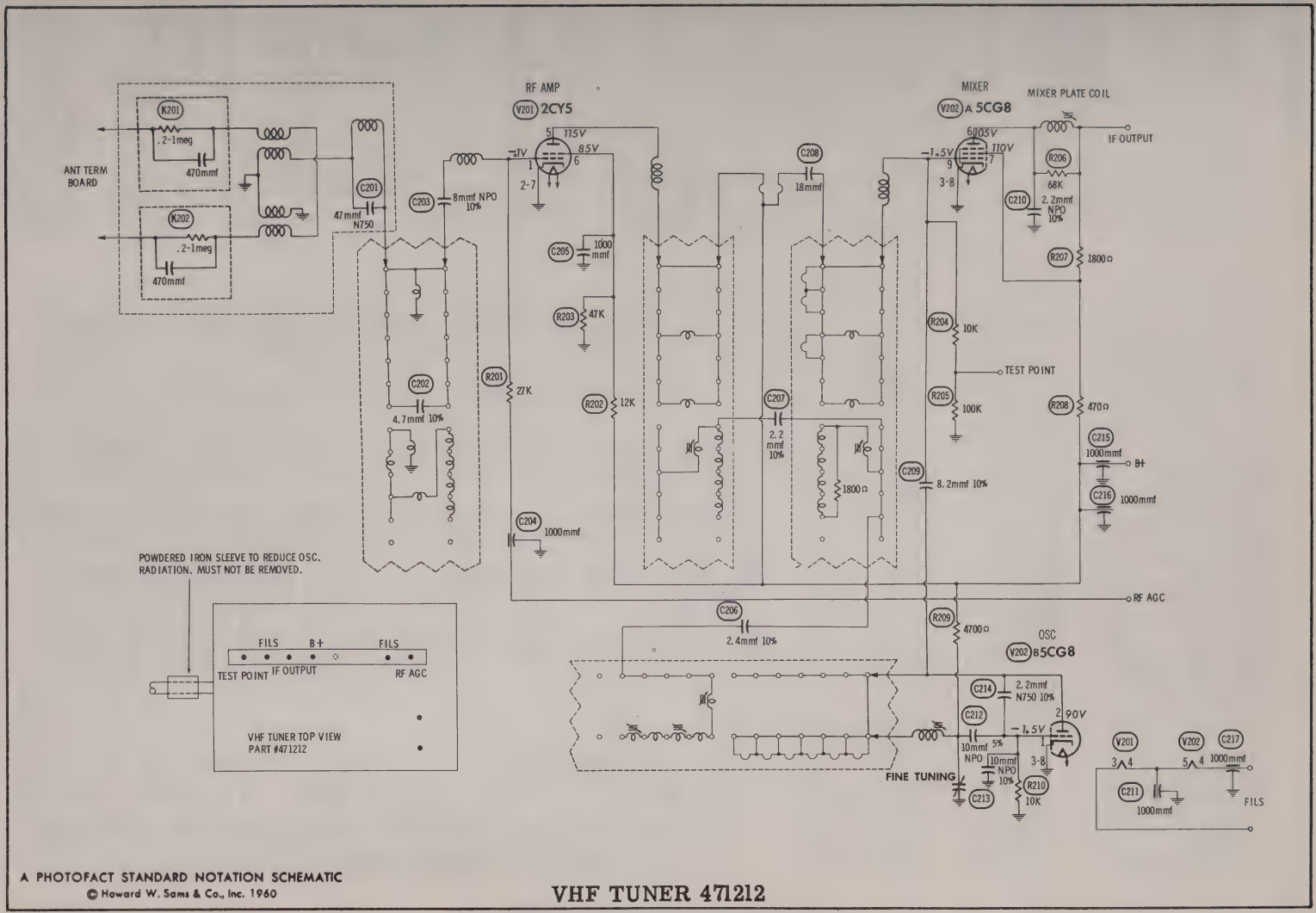
FIG. 1



CHASSIS BOTTOM VIEW



PRINTED BOARD - RESISTOR IDENT.



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VHF TUNER 471212

EMERSON MODELS 1524, 1525, 1526, 1527 (Ch. 120507A, 120508B)

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	* CBS * GENERAL ELECTRIC USE	TYPE	ITEM No.	RAYTHEON * SYLVANIA * USE	TYPE
V1	1st Video IF Amp	3CB6	V8	Sync Sep.	ECH81
V2	2nd Video IF Amp	3CB6	V9	Vert. Mult. + Vert Output	12BH5
V3	3rd Video IF Amp. - Video Det	5AS8	V10	Horiz. Mult.	6CG7
V4	Video Output - Vert Mult.	6EB8	V11	Horiz. Output	12BQ6GB
V5	Sound IF Amp.	3AU8	V12	Damper	1B3
V6	Audio Det	2DT8	V13	HV Rectifier	1GB3T (1G3GT/1B3GT) *
V7	Audio Output	12CU8/12C8 (13C8) * (13CU8) *			

* Alternate

PICTURE TUBE

ITEM No.	REPLACEMENT DATA: EMERSON PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
V14	17BJP4		17BJP4 ①	17BJP4 ①	17BJP4 ②	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP	VOLT	REPLACEMENT DATA: EMERSON PART No.	ARROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	350	160	926850	PR3-043		WT312	CDS-T-1000	TVAS-3437.6*	
B	120	160							
C3A	350	150	925499	PR3-120	XC9138	WD251		TVAS-2473 *	
B	50	150							
C3	100	50	923442	PRS200	SRS005	TC3501	TD-100-50	TVA-1310	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REMARKS	REPLACEMENT DATA: EMERSON PART No.	ARROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.047	200V		P3S5N-047	DD-503	CU23347	4DP-3-473	GEM-4147	MC-347	2TM-S47	
C5	100	M750	8%		DTN-100	CU2711		CNO-101	MTC-101	9TCU-T10	
C6	330			DS-330	LU2722	CD-33E		GPS33		10TS-T33	
C7	.047	200V		P3S5N-4	DF-104	CU4129	EDP-3-104	GEM-4104		2TM-P4	
C8	680		10%	DS-680	UST-T68	CD-68E		GPS68		10TS-T68	
C9	47	M750	10%	M75D-DZ 47	DTN-47	CU4470	CCTN-470	CNT-447		9TCU-Q47	
C10	1000			B1P2-001	DD-102	BTA102E	CDD-102	B-102		9SK-E02	
C11	330		10%	DS-330	DD-331	LU2733	CDD-331	GPS33		10TS-T33	
C12	750		10%	DS-750	DD-751	LS3775	CDD-751	GPS75		10TS-T75	
C13	1000		10%	DL-1000	DD-103	PME2K	CDD-103	GPS10		10TS-D10	
C14	8.2		10%	M2D-DZ 8.2		CSY5EC				9TCC-Y82	
C15	10		10%	DS-10	DD-100	LU24E	CDD-100	GPS10		10TS-Q10	
C16	4.7		10%	M2D-DZ 4.7	DTE-4R7	CU2747C	CCTO-4R7	CNO-447		9TCC-Y47	
C17	.047	200V		P3S5N-047	DD-503	CU23347	4DP-3-473	GEM-4147		2TM-S47	
C18	150		10%	DS-150	DD-151	LU2715	CDD-151	GPS15		10TS-T15	
C19	47	NPO	10%	M2G-DZ 47	DTG-470	CU2647C	CCTO-470	CNO-447		9TCC-Q47	
C20	470	NPO	10%	M2G-DZ 470	DTG-471	CU2647C	CCTO-471	CNO-447		9TCC-Q47	
C21	1.0	400V		P4S8N-1	DF-104	CU2471	4DP-3-104	GEM-401		4TM-P1	
C22	10000			B1P2-01	DD-103	BTA103E	CDD-103	B-103		9SK-E03	Note 1
C23	1800		10%	DL-1800	DD-182	PME2K	CDD-182	GPS18		10TS-D18	
C24	750		10%	DL-750	DD-751	LS3775	CDD-751	GPS75		10TS-T75	
C25	10000			B1P2-01	DD-103	BTA103E	CDD-103	B-103		9SK-E03	
C26	10000			B1P2-01	DD-103	BTA103E	CDD-103	B-103		9SK-E03	
C27	4.5	M750	5%	#23S9P3							
C28	10000				DD-103	BTA103E	CDD-103	B-103		9SK-E03	
C29	.01	400V		P4S8N-01	DS-103	CU24E	4DP-1-103	GEM-411		4TM-S1	
C30	15000			B1P2-015	DD-153	BTA103E3	CDD-153	B-103		9SK-E05	
C31	.047	400V		P4S8N-047	DD-503	CU24347	4DP-3-473	GEM-4147		4TM-S47	
C32	100		10%	DS-100	DD-101	LU2711	CDD-101	GPS10		10TS-T10	
C33	.1	400V		P4S8N-1	DF-104	CU24E	4DP-3-104	GEM-401		4TM-P1	
C34	.0033	1000V	10%				1E1P-3-332	GEM-16333		10TM-D3	
C35	1000		10%	DL-1000	DD-103	PME2K	CDD-103	GPS10		10TS-D10	
C36	.022	400V		P4S8N-022	DD-303	CU24322	4DP-3-223	GEM-4123		4TM-S22	
C37	.47	400V		P4S8N-47	DD-504	CU24P	4DP-3-474	GEM-401		4TM-P1	
C38	.1	600V		P4S8N-1	DS-104	CU24P	6DP-4-104	GEM-601		6TM-P1	
C39	1000	3000V		B1V2-D-1000	DD-103-153	BVK3D1K	3EV-2D3	BL-D3		3SK-D10	
C40	.33	400V		P4S8N-33			4DP-3-334	GEM-4033		4TM-P33	
C41	56		10%	DS-43	DD-E30	CD-56E	CDD-E30	GP4S3		10TS-Q43	
C42	82		10%	DS-82	DD-E30	LU24S3	CDD-E30	GP4S3		10TS-Q83	
C43	100		10%	DS-1000	DD-101	LU2E1	CDD-101	GPS10		10TS-D10	
C44	1000		10%	DL-1000	DD-102	LR5E	CDD-102	GPS20		10TS-D10	
C45	.1	400V		P4S8N-047	DD-504	CU24347	4DP-3-473	GEM-4147		4TM-S47	
C46	1000		10%	DL-1000	DD-102	PME2K	CDD-103	GPS20		10TS-D10	
C47	.0047	600V	10%	V6K3D47-10%		PME3K47	CDD-472	GEM-16247		6TM-D47	
C48	100		10%	1489-00001	TCE-100	22R5T1	CM-189-101K	MCB25		M5-E10	
C49	100		10%	1489-00013	TCE-100	22MT22	CM-189-224K	CMO-S22		M5-122	
C50	100		10%	DL-1000	DD-102	LR5E	CDD-103	GPS20		10TS-D10	
C51	.047	400V		P4S8N-047	DD-473	CU24347	4DP-3-473	GEM-4147		4TM-S47	
C52	.33	400V		P4S8N-33		CU24P33		GEM-4033			
C53	.1	600V		P4S8N-1	DF-104	CU24S1	6DP-4-104	GEM-601		6TM-P1	
C54	120	4000V	10%	#23S0S0							
C55	1000			B1P2-001	DD-102	BTA102E	CDD-102	B-102		9SK-E02	
C56	1000			B1P2-001	DD-102	BTA102E	CDD-102	B-102		9SK-E02	
C57	1000			B1P2-001	DD-102	BTA102E	CDD-102	B-102		9SK-E02	
C58	1000			B1P2-001	DD-102	BTA102E	CDD-102	B-102		9SK-E02	
C59	1000			B1P2-001	DD-102	BTA102E	CDD-102	B-102		9SK-E02	
C60	1000			B1P2-001	DD-102	BTA102E	CDD-102	B-102		9SK-E02	
C61	.047	600V		P4S8N-047	DD-503	CU23647	6DP-3-473	GEM-6147		6TM-S47	
C62	10000	1600V		B1V2-D-10	DD-103	BVK3D1K	3EV-2D3	DL-303		3SK-E10	
C63	1000			B1P2-01	DD-103	BVK3D1K	CDD-103	B-103		9SK-D03	
C64	.470	1600V		#23G2E5K	BVD-30-470	DDD-471	BVK3D1K	3EV-347		3GA-K47	

Note 1. May not be used in some versions. # Emerson Part Number.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: EMERSON PART No.	CENTRALAB PART No.	ALLEN-BRADLEY PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	1	390834			B13-127	PP18A	Volume
B	Switch					SK7	Not Req	Push-Push, Off-On
R2A	600Ω	1	390818	P3-3		FA28	Not Req	Contrast
B	Shaft			Not Req.		OS2E25		
R3A	500K	1	390819	P1-40				Brightness
B	2 Smeg			R3-76				Height
R4A	1.5meg	1	390820	F-84				Vert. Hold
B	500K			R2-40				Vert. Linearity
R5	150K		390821					Horiz. Linearity

†† "Concentrics" Equivalent: K-6 Kit with Rear Elements and Shafts: S1T-105, P1T-304 (Pairs)
† "Concentrics" Equivalent: K-6 Kit with Base Elements and Shafts: S1-133, P1T-304 (Pairs)
(Not available as a factory assembled unit.)
† "Concentrics" Equivalent: K-8 Kit with Base Elements and Shafts: S1-135, P1T-304 (Pairs)
(Not available as a factory assembled unit.)
● "WTA-LOC" Equivalent: FA35L, RU35L, OS2E25, 1K25.
▲ "WTA-LOC" Equivalent: FA35L, RU35L, OS2E25, 1K25.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R6	680Ω	
R7	680Ω	
R8	1.5meg	
R9	2.2meg	
R10	220K	
R11	470Ω	
R12	220Ω	
R13	15K	
R14	330K	
R15	470Ω	
R16	5Ω	
R17	100Ω	
R18	470Ω	
R19	47Ω	
R20	470Ω	
R21	180Ω	
R22	6800Ω	
R23	470Ω	
R24	39K	
R25	470K	
R26	1.5meg	
R27	33K	
R28	220K	
R29	6200Ω	
R30	4700Ω 2W	
R31	100Ω	
R32	2200Ω	
R33	1.5Ω 1W	

ITEM No.	RATING	REMARKS
R34	100K	
R35	180K	
R36	220K	
R37	470Ω	
R38	220Ω	
R39	220K	
R40	150K	
R41	560K	
R42	1200Ω	
R43	560Ω	
R44	470Ω 2W	
R45	180Ω	
R46	4.7meg	
R47	18K	
R48	820K	
R49	100K	
R50	18K 1W	
R51	4.7meg	
R52	2.2meg	
R53	2.2meg	
R54	100Ω 1W	
R55	6800Ω 1W	(6800Ω) *
R56	33K 1W	
R57	33K	
R58	4700Ω	
R59	100Ω	
R60	680Ω	
R61	82K	

ITEM No.	RATING	REMARKS
R62	82K	
R63	27K	
R64	1meg	
R65	1meg	
R66	2200Ω	
R67	1meg	
R68	47K	
R69	18K 1W	(18K) *
R70	330K	
R71	1000Ω	
R72	470K	
R73	4.7meg	
R74	470K	
R75	330K	
R76	180K	
R77	6800Ω	
R78	100Ω	
R79	6800 1W	
R80	220Ω	
R81	10Ω	
R82	4700Ω	
R83	2.9Ω 1W	
R84	130Ω 1W	
R85	10 1W	#394153
R86	1Ω	#39T103 ①
R87	2Ω 1W	#39T128
R88	2.5meg	②
R89	470K	

Emerson Part Number.
* Alternate Values.

① Fusible Type
② May not be used in some versions.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	EMERSON PART No.	REPLACEMENT DATA
X2	Sync Sep. Grid Coupling	220mmf, 10000mmf, 470K, 2.2meg	932053	
X3	Vert. Integrator	4700mmf, 12000mmf, 18.4K, 82K	932158	

COILS (RF-IF)

ITEM No.	USE	EMERSON PART No.	Cramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Rem PART No.	NOTES
L1	1st Video IF	736316						
L2	2nd Video IF	736318						
L3	4.5MC Trap	736317						
L4	3rd Video IF	736318						
L5	4th Video IF	736318						
L6	RF Choke	703715A	18-1003	19-2003	BC-584	4608		4.5th 100ua 350ua
L7A	Series Peaking Coil	703854A						
B	Shunt Peaking Coil							
L8A	4.5MC Trap	736297						
B	1st Sound IF							
L9	Series Peaking Coil	703279A	18-3500	19-3500	TV-303	6174	VP-8	50ua ①
L10	Series Peaking Coil	703357			TV-306	6148		750ua
L11	2nd Sound IF	736317						
L12	Quadrature Coil	730386						
L13	RF Choke		19-1005	19-1005	BC-586	4613		10ua ②
L14	Fil. Choke							
L15	Fil. Choke							

① Some versions may use 330ua in this application. ② IRC Part #CL-1.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.	REPLACEMENT DATA: EMERSON PART No.	Halldorson PART No.	Merit PART No.	Miller PART No.	Rem PART No.	Thordarson PART No.	NOTES
	PRI. SEC.							
L16	50Ω 718128							Horiz. Stabilizer

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT (100 Cps)	REPLACEMENT DATA: EMERSON PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L17	.230A	23Ω	.5 Hy.	737043				C-2343		C-37X

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: EMERSON PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	Vert. Output	736170	26870	A-3922 ①					A-117X
T2	Yoke Horiz. (24MS) 60° Vert. (30MS)	736353 ②	Y-16 ②③	M2F-92 ②③	Y90F16/43 ②③	PCM2048 ②③	DT-36A ③	Y-16 ③③	C-43 & 139J
	Rear Cover and Centering Device	736354							
T3	Horiz. Output	736169					BIO-H4		

① Drill new mounting hole(s).
② Connect yoke terminal #3 to Horiz. Output Transformer Terminal #6; Yoke Terminal #2 and #7 to Resistor R82; Yoke Terminal #4 to Horiz. Output Terminal #1; Requires new rear cover and centering device.
③ Centering jumper across R81 may or may not be used.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC	REPLACEMENT DATA: EMERSON PART No.	Halldorson PART No.	Merit PART No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	2400Ω	3-4Ω	734186	34853 ①	A-3028 ①	AU-808 ①	A-3333 ①	34853 ①	S-11X ①	① Use original frame.

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP	REPLACEMENT DATA: EMERSON PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	180154B	4A07	

RECTIFIERS

ITEM No.	RATING: CURRENT (Measured)	REPLACEMENT DATA: EMERSON PART No.	ITT PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.280A	SI7086 or SI7068	SI8504	1N1764	F4	SR500	Silicon
M3		SI7074	K2616				Dual Selenium

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: LITTELFUSE PART No. FUSE	HOLDER	BUSS PART No. FUSE	HOLDER	NOTES
M3	N	1 1/4A 125V 8/5	312L.25 (N 1 1/4 A 125V 8/5)	34601	N 1 1/4	HN 3/4 to 1 1/4	

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M4	Tuner	471342	VHF, Chassis 120567A
	Tuner	471343	VHF with UHF Provision, Chassis 120568B
	Tuner	471340	UHF
M5	Switch		Local-Normal (DPST Slide Type)
M6	Switch		Fringe - Normal (DPST Slide Type)
M7	Antenna	471069 or 471090	JFD REPLACEMENT TYPE #TA-443, Models 1524, 1525

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

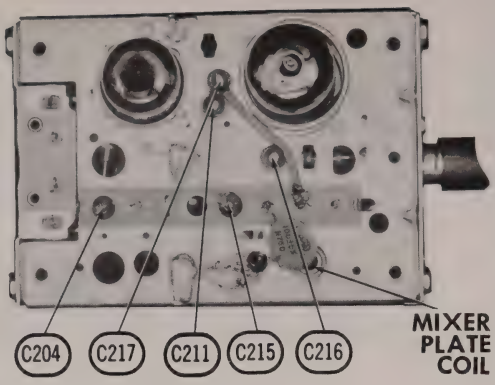
NAME	PART NO.	DESCRIPTION
Safety Glass (Lens)	481340	Plastic
Plastic Front	481339	Plastic, Models 1524, 1526
Plastic Front	481341	Plastic, Models 1525, 1527
Knob	481181	VHF Channel Select, Models 1524, 1526
Knob	481193	VHF Channel Select, Models 1525, 1527
Knob	481287	UHF Channel Select, Models 1525, 1527
Knob	481301C	Fine Tuning
Knob	481190C	Volume
Knob	481184	Brightness, Contrast, Vertical Hold
Handle	595038	Molded, Models 1524, 1525

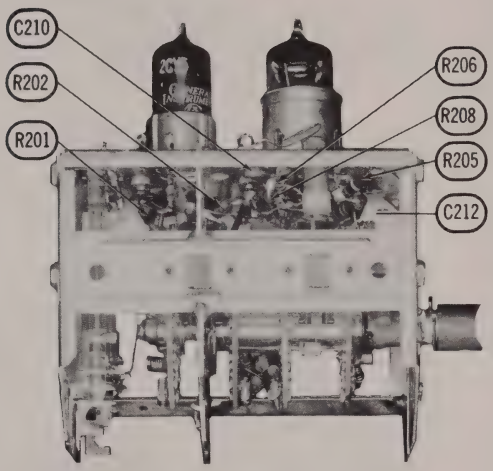
WIRING DATA

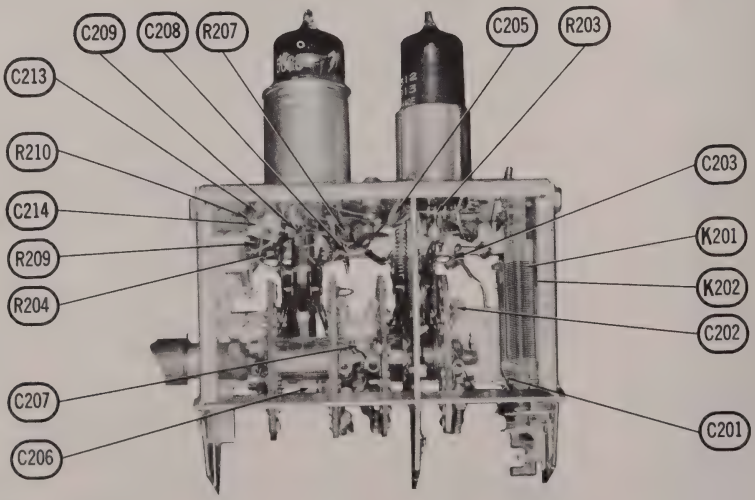
High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8886 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8534 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8254
2000 Tuner Input Lead	Use BELDEN No. 8231
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8276
Antenna Rotor Cable	Use BELDEN No. 8404 (Flat) or 8404 (Round) – 4 Conductor 8408 (Round) – 5 Conductor 8416 (Round) – 8 Conductor

EMERSON MODELS 1524, 1525, 1526, 1527 (Ch. 120507A, 120508B)

FOLDER 2







TUNER 471212

TUNER PARTS LIST AND DESCRIPTIONS

TUBES

• CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •

ITEM No.	USE	TYPE
V201	RF Amp.	2CY5
V202	Mixer - Osc.	5CG8

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C202	4.7 10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C203	8 NPO 10%		NPO-DI 8.2		C10V8C			10TCC-V82
C204	1000		EF-001	MFT-1000		CCF-102	CT280A	
C205	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C206	2.4 10%		NPO-SI 2.2	TCZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C207	2.2 10%		NPO-SI 2.2	TCZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C208	18		NPO-DI 20	TCZ-18	C10Q18C	CCTO-180	CNO-418	10TCC-Q18
C209	8.2 10%		NPO-SI 8.2		C10V82C			10TCC-V82
C210	2.2 NPO 10%		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C211	100 N750 5%			DTZ-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C212	10 NPO 5%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C213	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C214	2.2 N750 10%						CN7-522	10TCU-V22
C215	1000		EF-001	MFT-1000		CCF-102	CT280A	
C216	1000		EF-001	MFT-1000		CCF-102	CT280A	
C217	1000		EF-001	MFT-1000		CCF-102	CT280A	
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R201	27K	
R202	12K	
R203	47K	
R204	10K	
R205	100K	
R206	68K	
R207	1800Ω	
R208	470Ω	
R209	4700Ω	
R210	10K	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	EMERSON PART No.	REPLACEMENT DATA
K201	Antenna Filter	470mmf, .2-1meg		Centralab RC-471 Sprague AC1-1
K202	Antenna Filter	470mmf, .2-1meg		Centralab RC-471 Sprague AC1-1

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

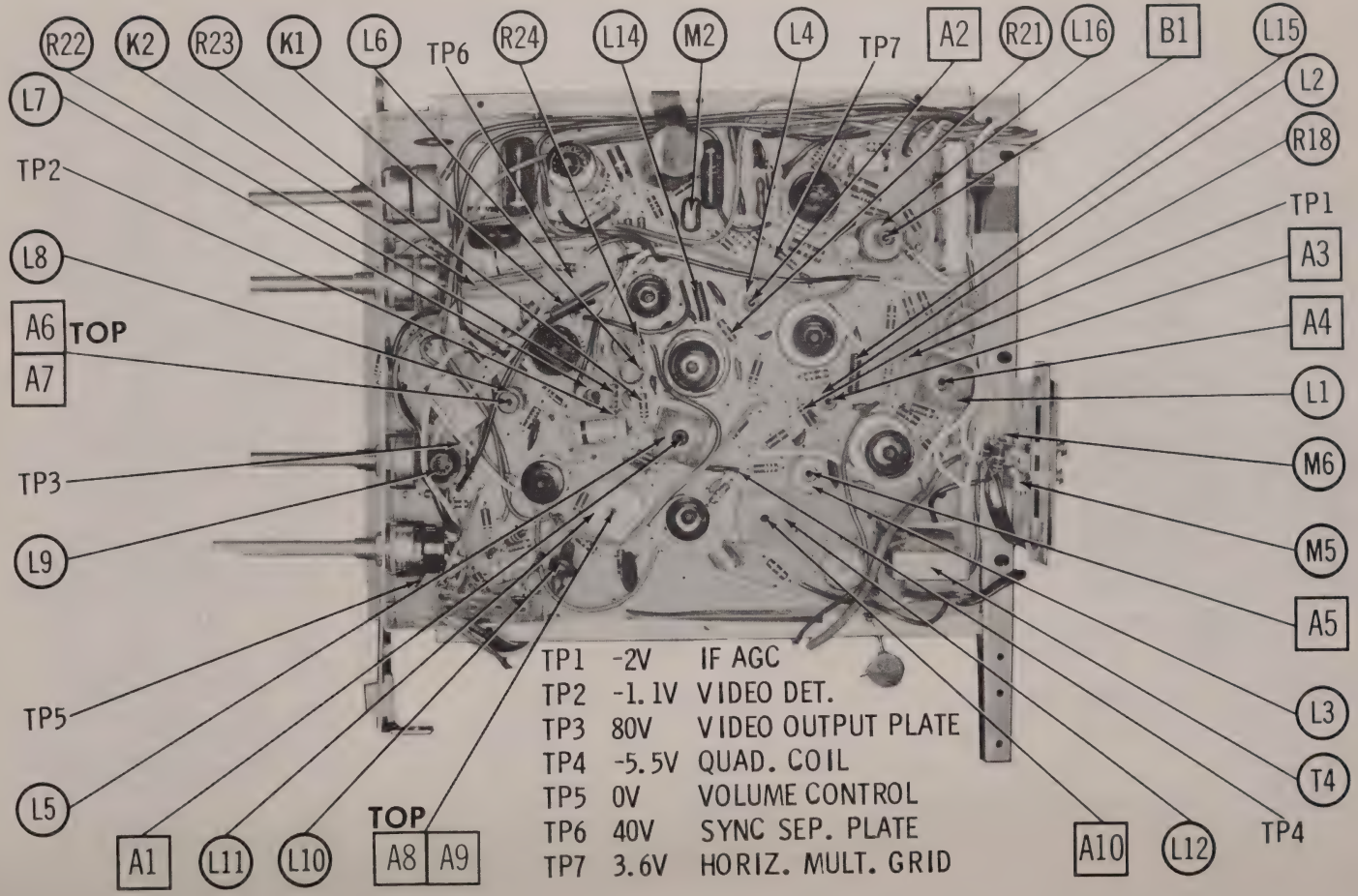
Suggested Alignment Tools: GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

VHF OSCILLATOR ALIGNMENT

Channel 13 oscillator adjustment slug (A201) is also used for adjusting the other high band (12 thru 7) channels. Channel 6 oscillator adjustment slug (A202) is also adjusted for channel 5. Channel 4 oscillator adjustment (A203) is also adjusted for channel 3. Channel 2 oscillator slug (A204) is used only for channel 2.
Turn the set on and tune in the highest high band channel and adjust controls for normal operation. Set fine tuning to the center of its range. Adjust A201 for best picture and sound. Switch to next high band channel. If necessary to adjust, do so by bending coil loop appearing at the hole to left of tuner shaft for best picture and sound.
Switch channel selector to the highest low band channel (6 thru 2) operating in the area. Adjust proper slug for best picture and sound. If channel 5 or 3 needs adjusting, it will be necessary to switch to the next higher channel, adjust slug slightly, then switch back to the channel needing adjustment and check picture. Repeat until proper results are obtained. Repeat procedure until all channels operating in the area have been properly adjusted.

VHF RF AND MIXER ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.

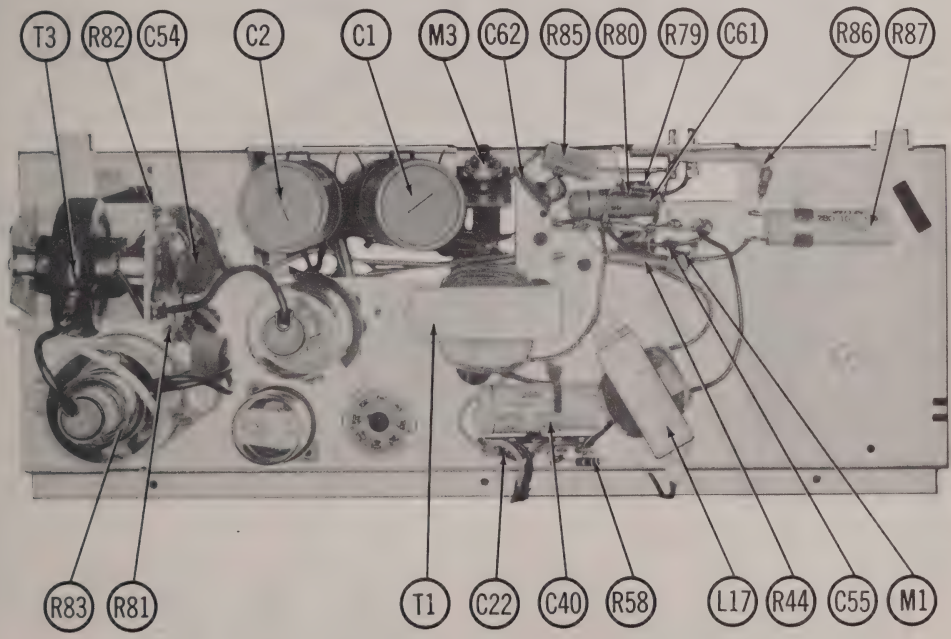


PRINTED BOARD - ALIGN., INDUCTOR, RESISTOR, & MISC. IDENT.

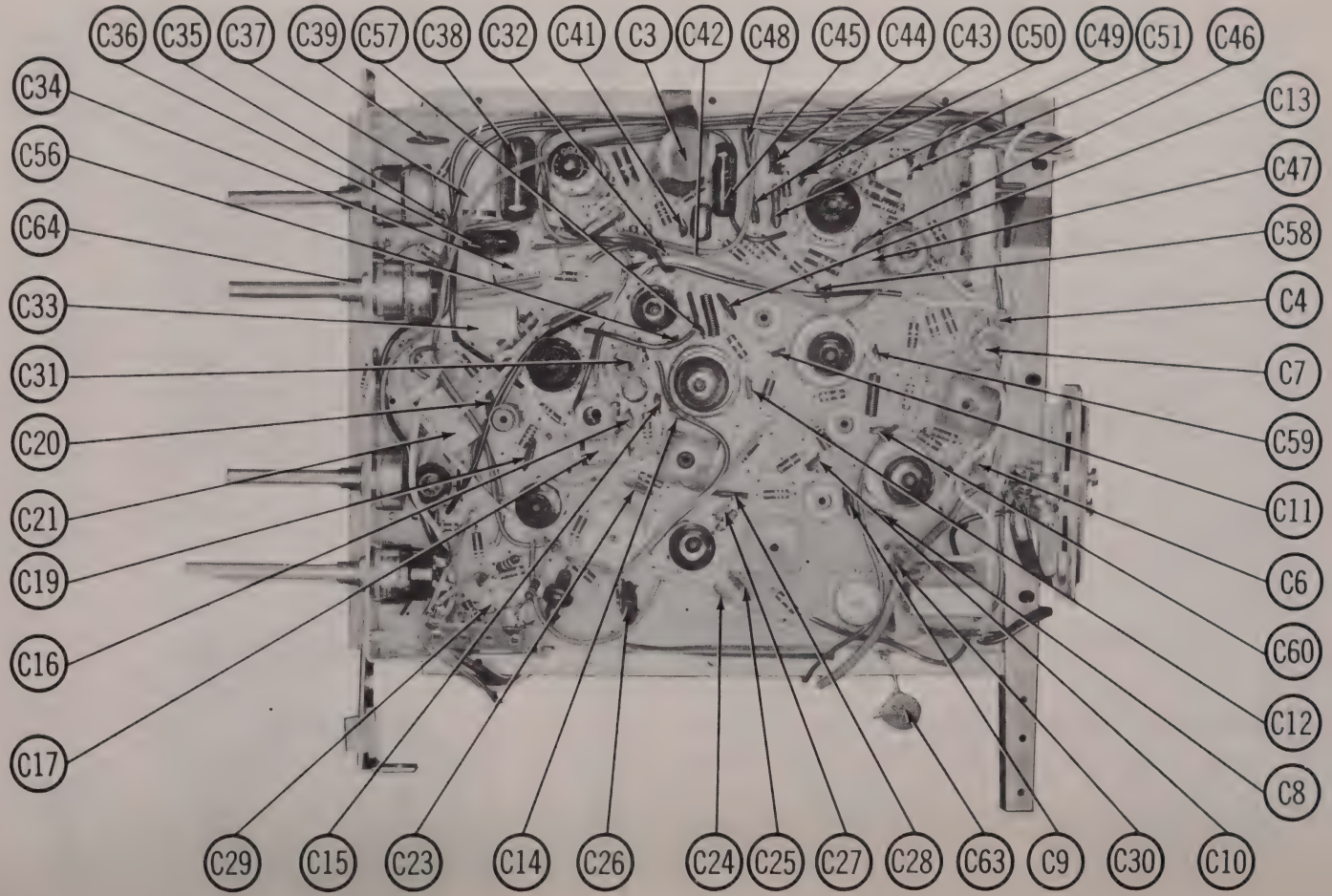
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3CB6	1.1meg	56Ω	3.5Ω	4.5Ω	†610Ω	†610Ω	0Ω		
V2	3CB6	1.1meg	47Ω	4.5Ω	5.5Ω	†610Ω	†610Ω	0Ω		
V3	5AS8	†610Ω	.1Ω	180Ω	5.5Ω	6.5Ω	4700Ω	0Ω	.1Ω	†610Ω
V4	8EB8	0Ω	• 1meg	• ‡5.5meg	9.5Ω	7.5Ω	• 30Ω	500K	†2300Ω	†4800Ω
V5	3AU6	2Ω	0Ω	7.5Ω	7Ω	†610Ω	†610Ω	220Ω		
V6	3DT6	5.5Ω	560Ω	6.5Ω	7Ω	‡240K	†2300Ω	560K		
V7	12CU5 12C5	180Ω	0Ω	15Ω	18Ω	0Ω	†470Ω	†660Ω		
V8	3CS6	†820K	0Ω	9.5Ω	10Ω	†90K	†18K.	1.9meg		
V9	12DB5	†140Ω	100Ω	• 2.4meg	13Ω	10Ω	• 2.4meg	100Ω	NC	†250Ω
V10	6CG7	‡200K	• 490K	1000Ω	15Ω	13Ω	†15K	1.3meg	1000Ω	0Ω
V11	12DQ6B	NC	20Ω	NC	†150Ω	250K	TP	23Ω	0Ω	TOP CAP ‡18Ω
V12	12D4	NC	NC	¶250K	NC	†30Ω	NC	20Ω	18Ω	
V13	1G3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡418Ω
V14	17BJP4	0Ω	4700Ω	Pin 6 0Ω	Pin 10 ‡180K	Pin 11 • 120K	Pin 12 1.5Ω			
V201	2CY5	1.1meg	0Ω	3.5Ω	3Ω	†610Ω	†12K	0Ω		
V202	5CG8	10K	†5300Ω	0Ω	1.5Ω	3Ω	†2700Ω	†1000Ω	0Ω	110K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

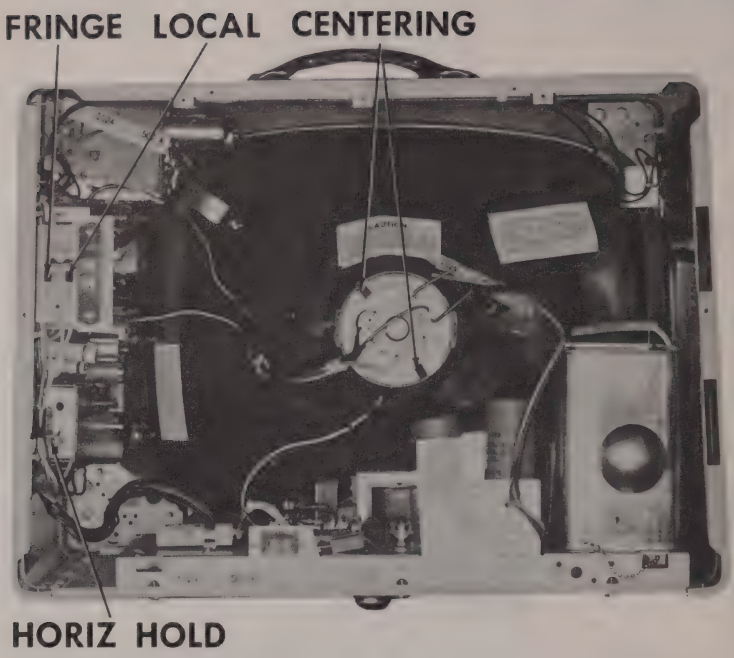
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM OUTPUT OF M1.
‡ MEASURED FROM PIN 3 OF V12.
NC NO CONNECTION
TP TIE POINT



CHASSIS—TOP VIEW



PRINTED BOARD - CAPACITOR IDENT.



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Suggested Alignment Tools: GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440; WALSCO #2626, 2543, 2544, 2545

Tune in a TV signal and set the "Fringe-Normal" Switch to normal.

Connect a clip lead across the Horizontal Stabilizing Coil (L16). Connect another clip lead from TP-7 to chassis.

Adjust the Horizontal Hold until the picture synchronizes horizontally. (In most cases the picture will appear to float back and forth across the screen.)

Remove the clip lead from L16. Adjust the Horizontal Frequency Slug (B1) until the picture again synchronizes horizontally.

Remove the clip lead from TP-7 and chassis. The picture should then lock in solid.

PHOTOFACT® Folder

**PRODUCTION CHANGE
BULLETIN 243**

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 9 IN SET 412

General Electric Models C415, A, B, C416, A, B, C417, A, B were covered in PHOTOFACT Folder 9 - Set 412.

Models C415C, C416C, C417C are added along with late production changes with the publication of this bulletin.

CAPACITOR CHANGES

C1A, B (Filter Capacitor) is changed to Part #RS-2151.

M2 (Tuning Capacitor) is changed to Part #RS-1480.

COIL CHANGES

L1 (Loopstick Antenna) is changed to Part #RS-1481.

L2 (Oscillator Coil) is changed to Part #RS-1479.

L3 (Input IF) is changed to Part #RS-2149.

L4 (Output IF) is changed to Part #RS-2149.

SPEAKER CHANGE

SP1 (Speaker) is changed to Part #RB-1057.

TUBE CHANGE

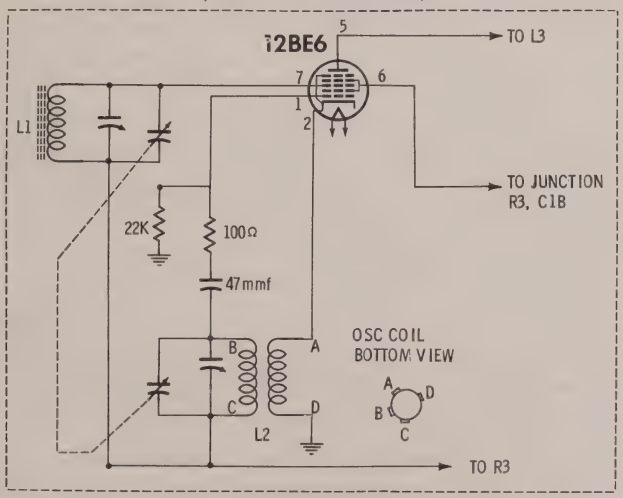
V1 (Converter) is changed from a Type 12AU6 Tube to a Type 12BE6 Tube. A partial schematic diagram showing the converter circuit changes is given below in this bulletin.

GENERAL ELECTRIC MODELS C415C, C416C, C417C

PRODUCTION CHANGE
BULLETIN 243

PRODUCTION CHANGE
BULLETIN 243

(Continued On The Reverse Side)



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SET 498 FOLDER 3

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	RS-2040	Tuning, Volume
Knob	RS-1173	Snooz-Alarm, Model C415C
Knob	RS-1172	Snooz-Alarm, Model C416C
Knob	RS-1171	Snooz-Alarm, Model C417C
Knob	RS-1096	Clock (Lever Type)
Dial Scale & Window	RS-1170	
Dial Pointer Assy.	RS-2159	
Cabinet Front	RB-1025	Ivory, Model C415C
Cabinet Front	RB-1026	Pink, Model C416C
Cabinet Front	RB-1027	Turquoise, Model C417C
Cabinet Back	RB-1028	Ivory, Model C415C
Cabinet Back	RB-1029	Pink, Model C416C
Cabinet Back	RB-1030	Turquoise, Model C417C

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 9 IN SET 304

MAGNAVOX CHASSIS CMUA460, CMUA461, CMUA464, CMUD444, CMUD462, CTA460, CTA461, CTA464, CTD444, CTD462

Magnavox Chassis CMUA440AA, CMUA441AA, CMUA442AA, CTA440AA, CTA441AA, CTA442AA were covered in PHOTOFACT Folder 9 - Set 304.

Chassis CMUA460, CMUA461, CMUA464, CMUD444, CMUD462, CTA460, CTA461, CTA464, CTD444, CTD462 are added along with late production changes with the publication of this bulletin.

PICTURE TUBE CHANGE

The chassis added with the publication of this bulletin use a Type 21ATP4 picture tube.

COMPONENT CHANGES

C57 is increased from .0022 to .01.

C77 is increased from 330mmf to 360mmf.

R91 is decreased from 1500Ω to 1300Ω.

R92 is increased from 82K to 100K.

R5 is increased from 25K to 50K (Part #220129-7).

COMPONENT ADDED

A 27Ω 1 watt resistor is added from pin 8 of V17 (6CU6) to ground.

Ch. CMUD444, CMUD462, CTD444, CTD462

CIRCUIT ADDED

These chassis use a different audio circuit. A partial schematic diagram showing these changes is given in the bulletin. When the new audio circuit is used, the sound is fed to another Chassis Amp - 135. For information on Chassis Amp - 135 see PHOTOFACT Folder 6 in Set 288.

(Continued On The Reverse Side)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 21 IN SET 444

WESTINGHOUSE MODELS H-748T5, H-749T5, H-750T5 (CH. V-2395-2)

Westinghouse Models H-681T5, H-682T5, H-683T5 (Ch. V-2395-1) were covered in PHOTOFACT Folder 21 - Set 444.

Models H-748T5, H-749T5, H-750T5 (Ch. V-2395-2) are added with the publication of this bulletin. These units are electrically identical except for the following changes.

COMPONENT CHANGES

L1 (Loopstick Antenna) is changed to Part #310V059H01.

M1 (Tuning Capacitor) is changed to Part #330V036H01.

R1 (Volume Control and Switch) is changed to Part #270V094H01.

T1 (Output Transformer and Speaker) is changed to Part #570V084H01.

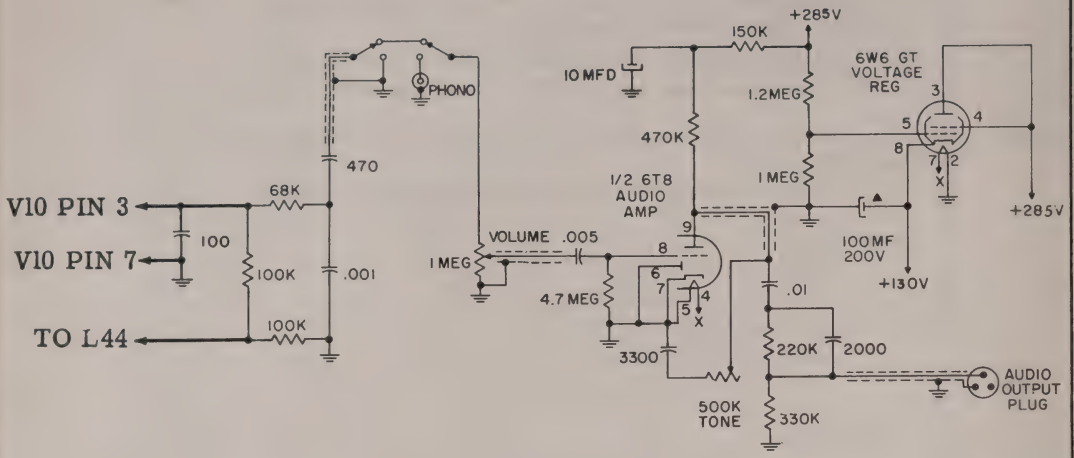
CIRCUIT ADDED

A voice-music switch is added to pin 2-5 of V4 (50C5). The voice side of the switch remains open, the music side of the switch is connected to the secondary winding of T1 through a 1000mmf ceramic capacitor. The other side of output transformer (T1) secondary is connected to ground.

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	550V116H02	Tuning
Knob	550V154H01	Off-On Volume
Cabinet	513V066H01	Charcoal & White, Model H-748T5
Cabinet	513V066H02	Vermillion & White, Model H-749T5
Cabinet	513V066H03	Ivory & White, Model H-750T5
Front Panel	558V317H01	



Partial Schematic Diagram Courtesy of Magnavox Company

PHOTOFACT® Folder

AIRLINE MODELS GAA-1014A, B, C, GAA-2610A, GAA-2611A

AIRLINE MODELS GAA-1014A, B, C, GAA-2610A, GAA-2611A

MODEL GAA-1014C

AIRLINE MODELS GAA-1014A, B, C, GAA-2610A, GAA-2611A

TRADE NAME	Airline Models GAA-1014A, GAA-1014B, GAA-1014C (Portable Models) GAA-2610A, GAA-2611A (Console Models)
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago 7, Illinois
TYPE SET	AC Operated 3 Tube Stereo Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 32 Watts, .35 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER — SEE SIMILAR V-M 1201 — PHOTOFACT SET 436 FOLDER 18 OR RECORD CHANGER MANUAL RC-12

SET 498 FOLDER 4

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆			◆ RAYTHEON ◆ SYLVANIA ◆		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel 1 AF Amp. - Channel 2 AF Amp.	12AX7	V2 V3	Channel 1 Output Channel 2 Output	50C5 50C5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	200	1034 ①		C1080	FP341, 3	TMT-132	TVL-3422	①
B	■40	150			BR8035	TC26	TD-80-350	TVA-1716	
C	▲20	150							
D	25	25	①						

① Model GAA-1014A uses 3 section unit omitting C1D (Part #1018).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C3	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C4	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C5	.05 200V		P288N-05	DD-503	CUB2S5	4DP-3-503	GEM-415	2TM-S5
C6	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C7	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C8	.05 200V		P288N-05	DD-503	CUB2S5	4DP-3-503	GEM-415	2TM-S5
C9	.05 600V		P688N-05	DD-503	CUB6S5	6DP-3-503	GEM-615	6TM-S5
C10	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	3meg		435	B-85			FC36A	Loudness, Channel 2
B	3meg			SR-85			RU36A	Loudness, Channel 1
C	Shaft			Not Req.			CS3500	
R2A	500K		436	B-60				Balance, Channel 2
B	500K			SR-613				Balance, Channel 1
R3A	2meg		437	B-76			FA26A	Tone, Channel 2
B	2meg			SR-76			RU26A	Tone, Channel 1
C	Shaft			Not Req.			CS3500	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

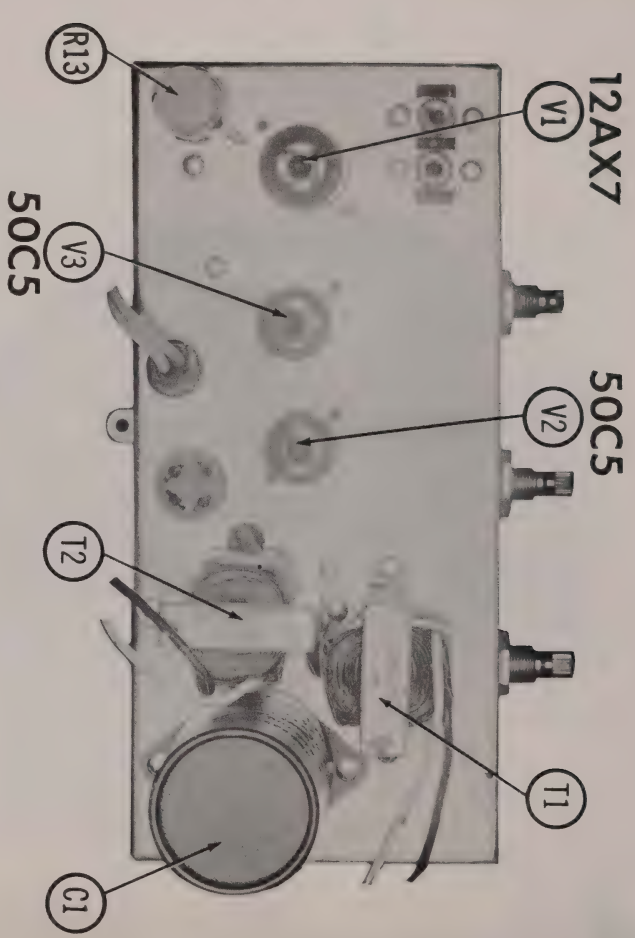
ITEM No.	RATING	REMARKS
R4	10meg	
R5	220K	
R6	82Ω 2W	Note 1
R7	10meg	

ITEM No.	RATING	REMARKS
R8	220K	
R9	2200Ω	
R10	82Ω 2W	
R11	27Ω 2W	

ITEM No.	RATING	REMARKS
R12	36Ω 2W	
R13	600Ω 5W	
R14	270K	

Note 1. Model GAA-1014A uses one 150Ω resistor in each output.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2600Ω	3-4Ω	1216	24S53	A-3025	AU-605	A-3332	24S53	S-12X	
T2	2900Ω	3-4Ω	1216A	24S53	A-3025	AU-605	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA AIRLINE PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	6"	PM	3-4Ω	2627 *	6A1	* Portable Models
SP2	4"	PM	6-8Ω	2647 *	4A1Z7	♦ Console Models
SP3	4"x 6"	PM	3-4Ω	2648 *	4GA1	
	6"	PM	3-4Ω	2646 ♦	6A21	
	6"	PM	3-4Ω	2646 ♦	6A21	

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA AIRLINE PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.096A	2763 *	2E4 *	RE504 *	K200 *	SR200 *	* Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA AIRLINE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE
M2	60-66	13TB		66		46		10T2B-S	

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA AIRLINE PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	REMARKS
M3		* W-808DS †♦	* 46 †	† Jewel ♦ Diamond * Includes Cartridge

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	2462	Loudness, Balance, Tone

WIRING DATA

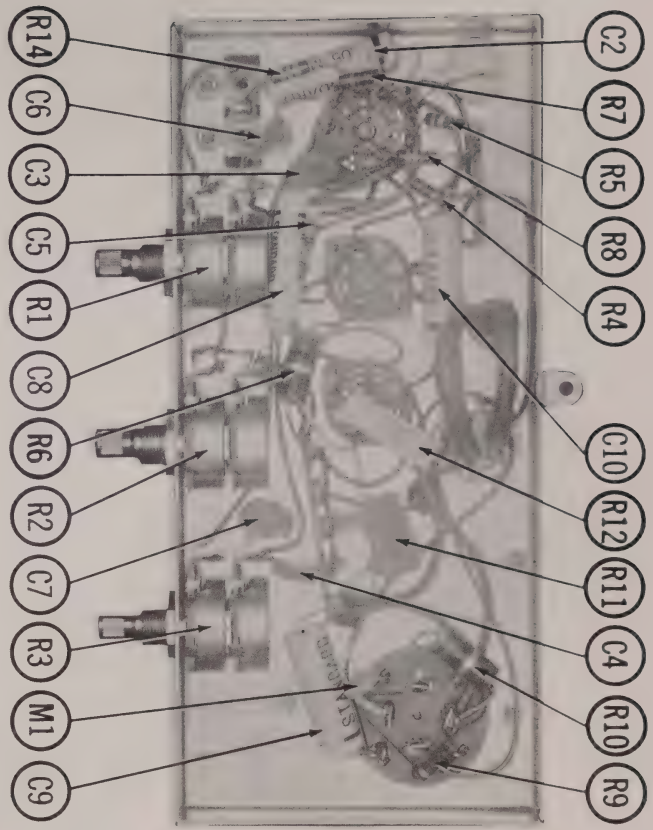
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) .....Use BELDEN No. 8401

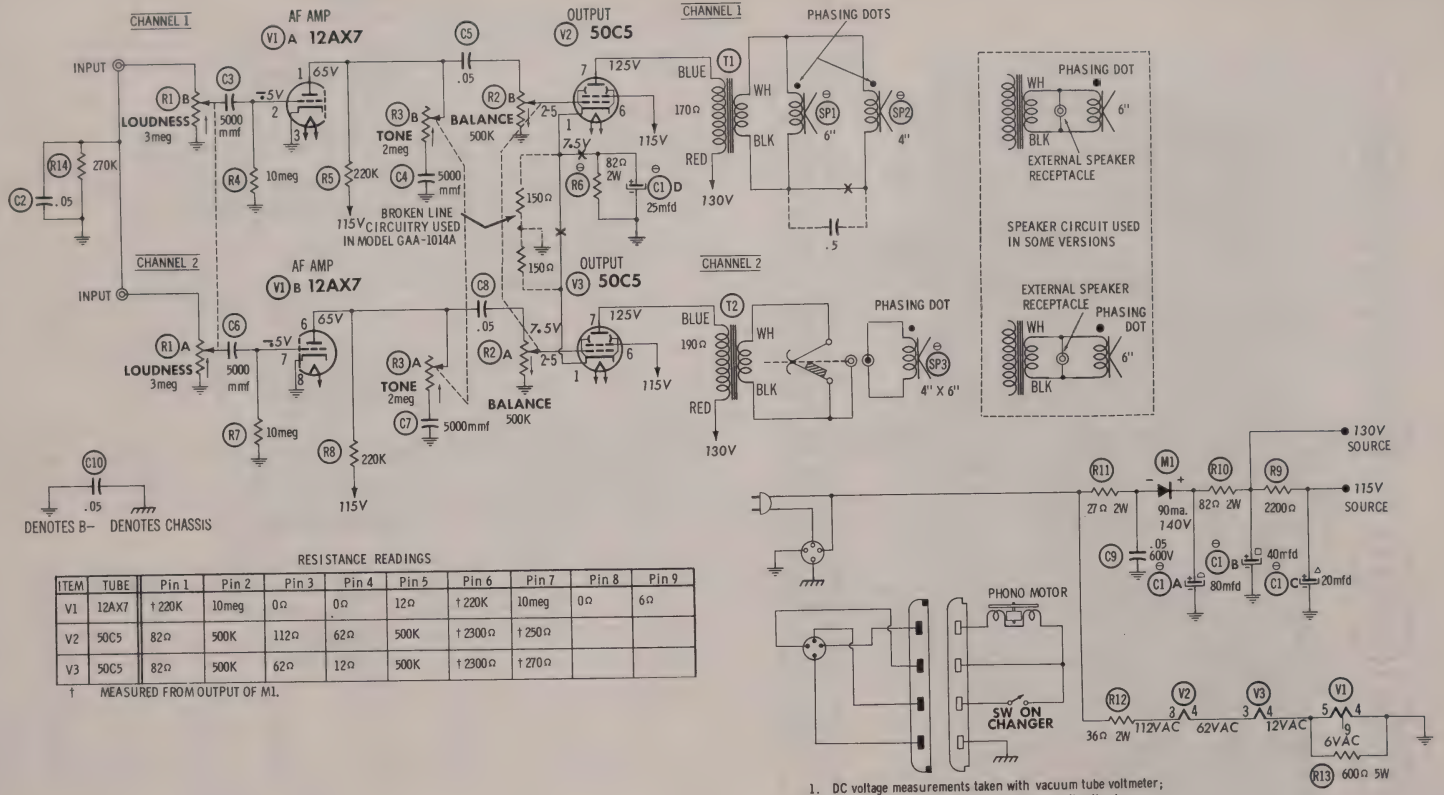
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW



AIRLINE MODELS GAA-1014A, B, C, GAA-2610A, GAA-2611A

FOLDER 4



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†220K	10meg	0Ω	0Ω	12Ω	†220K	10meg	0Ω	6Ω
V2	50C5	82Ω	500K	112Ω	62Ω	500K	†2300Ω	†250Ω		
V3	50C5	82Ω	500K	62Ω	12Ω	500K	†2300Ω	†270Ω		

† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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AIRLINE MODELS GAA-1014A, B, C, GAA-2610A, GAA-2611A

PHOTOFACT® Folder with CIRCUITRACE®

**CROWN
MODEL TRP-10**

CROWN
MODEL TRP-10

CROWN
MODEL TRP-10

TRADE NAME	Crown Model TRP-10		
IMPORTER	Shriro, Inc., 276 Fourth Ave., New York 10, N. Y.		
TYPE SET	Battery Operated Transistorized Portable AM Receiver With 3 Speed Manual Record Player		
POWER SUPPLY	9 Volts DC	RATING	10MA @ 9 Volts DC (No Signal, Min. Volume)
TUNING RANGE—BROADCAST	535 — 1650KC		15MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools: A1, A2, A3.... GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538
A5, A6.....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1600KC	1600KC	"	A4	"
3.	"	600KC	600KC	"	A5	"
4.	"	1400KC	Tune to 1400KC signal.	"	A6	Adjust for maximum output. Repeat Steps 2, 3 and 4.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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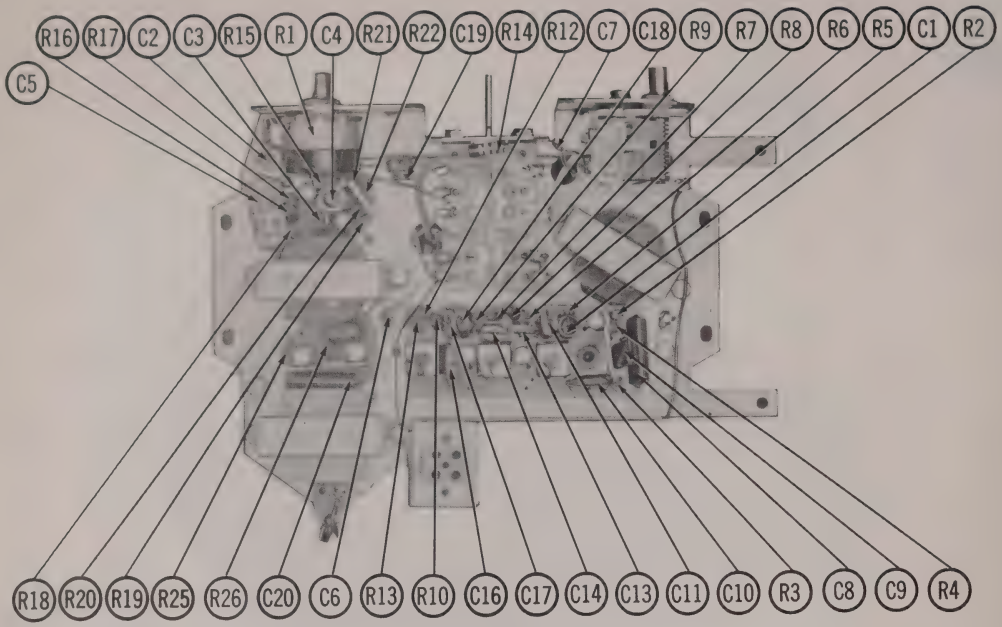
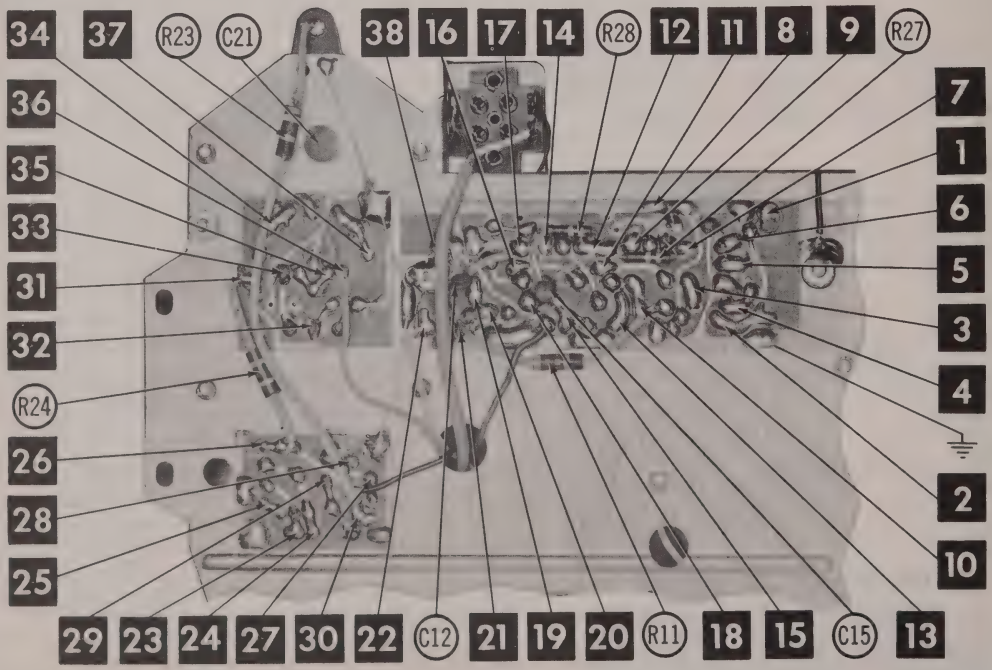


CHASSIS BOTTOM VIEW-CAPACITOR AND RESISTOR IDENTIFICATION



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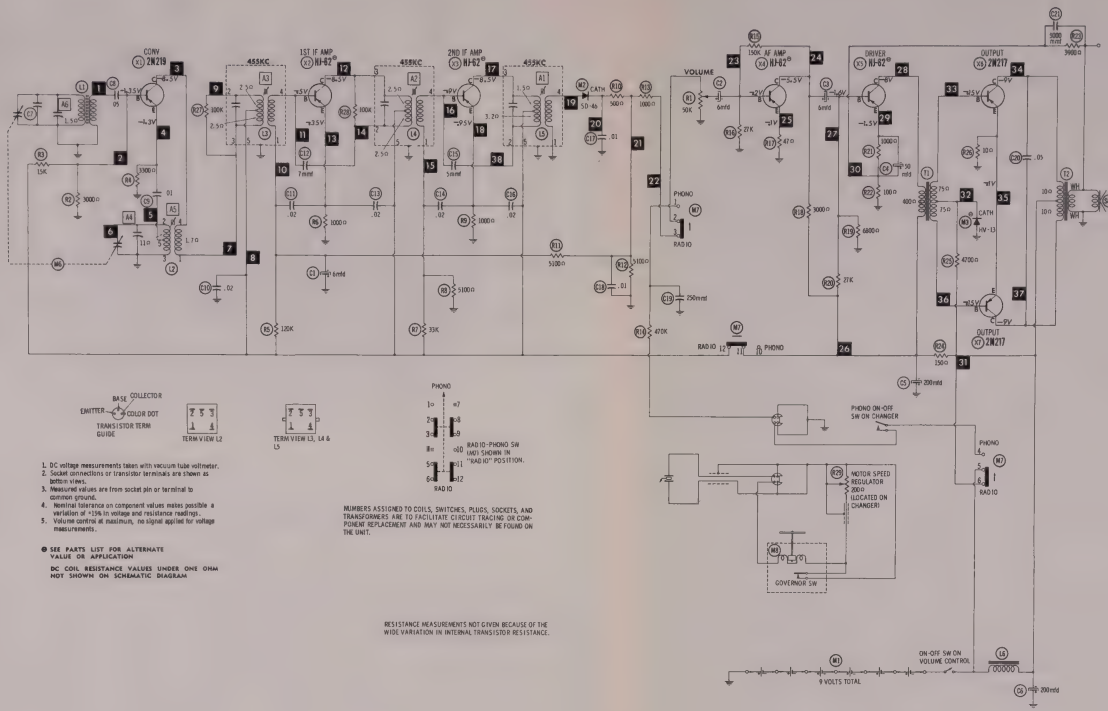
PRINTED BOARD



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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CROWN
MODEL TRP-10

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N219	Converter		2N219	2N485	2N219	PNP
X2	HJ-62*	1st IF Amplifier		2N218	2N483	2N218	PNP
X3	HJ-62*	2nd IF Amplifier		2N218	2N483	2N218	PNP
X4	HJ-62 †	AF Amplifier		2N407	2N362	2N104	PNP
X5	HJ-62 †	Driver		2N407	2N362	2N104	PNP
X6	2N217	Output		2N217	2N633	2N217	PNP
X7	2N217	Output		2N217	2N633	2N217	PNP

* Alternate Type 2N218.
† Alternate Type 2N215.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	CROWN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	6	6		XPP-6006	NLW5-6	TT6X5	ML6-6	TE-1085	
C2	6	6		XPP-6006	NLW5-6	TT6X5	ML6-6	TE-1085	
C3	6	6		XPP-6006	NLW5-6	TT6X5	ML6-6	TE-1085	
C4	50	6		XPP-6050	NLW50-6	TT6X50	ML50-6	TE-1100	
C5	200	10		BCD10190				TE-1119.6	
C6	200	10		BCD10190				TE-1119.6	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C7								
C8	.05 50V		V84C2S5	DD-503	CUB2S5	1DP-2-503	GEM-415	2TM-S5
C9	.01 50V		V84C2S1	DD-103	CUB4S1	1DP-1-103	GEM-411	4TM-S1
C10	.02 50V		V84C2S22	DD-203	CUB2S2	1DP-1-203	GEM-412	2TM-S2
C11	.02 50V		V84C2S22	DD-203	CUB2S2	1DP-1-203	GEM-412	2TM-S2
C12	7		NPO-DI 6.8	DTZ-6R8	C10V7C	CCTO-6R8	CNO-568	10TCC-V68
C13	.02 50V		V84C2S22	DD-203	CUB2S2	1DP-1-203	GEM-412	2TM-S2
C14	.02 50V		V84C2S22	DD-203	CUB2S2	1DP-1-203	GEM-412	2TM-S2
C15	5		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	ONO-547	10TCC-V50
C16	.02 50V		V84C2S2	DD-203	CUB2S2	1DP-1-203	GEM-412	2TM-S2
C17	.01 50V		V84C2S1	DD-103	CUB4S1	1DP-1-103	GEM-411	4TM-S1
C18	.01 50V		V84C2S1	DD-103	CUB4S1	1DP-1-103	GEM-411	4TM-S1
C19	250		1468-00025	DD-251	5W5T25	CM-19B-251M	MC240	1FM-325
C20	.05 50V		V84C2S5	DD-503	CUB2S5	1DP-2-503	GEM-415	2TM-S5
C21	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CROWN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	50K	½						Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	3000Ω	
R3	15K	
R4	3300Ω	
R5	120K	
R6	1000Ω	
R7	33K	
R8	5100Ω	
R9	1000Ω	
R10	500Ω	

ITEM No.	RATING	REMARKS
R11	5100Ω	
R12	5100Ω	
R13	1000Ω	
R14	470K	
R15	150K	
R16	27K	
R17	47Ω	
R18	3000Ω	
R19	6800Ω	

ITEM No.	RATING	REMARKS
R20	27K	
R21	1000Ω	
R22	100Ω	
R23	3900Ω	
R24	150Ω	
R25	4700Ω	
R26	10Ω	
R27	100K	
R28	100K	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		CROWN PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick							
L2	Osc. Coil							
L3	1st IF Trans.							
L4	2nd IF Trans.							
L5	3rd IF Trans.							

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 ∿	CROWN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L6		2.2Ω	7.5MH							

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CROWN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1, 2	1	TRT-9						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	CROWN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	350Ω	3-4Ω	TRT-10							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	CROWN PART No.	QUAM PART No.	
SP1	3"x 5½"	PM	3-4Ω	EU3BG		

BATTERIES

ITEM No.	VOLTAGE	CROWN PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1½V			230 *		A100 *		M-13R *	* 6 Required

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		CROWN PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	SD-46		1N60	1N60	1N60	Detector
M3	HV-13 *					Bias, Output Transistor

* Alternate Type HV-16.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA									
	CROWN PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M4									

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	CROWN PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M5				

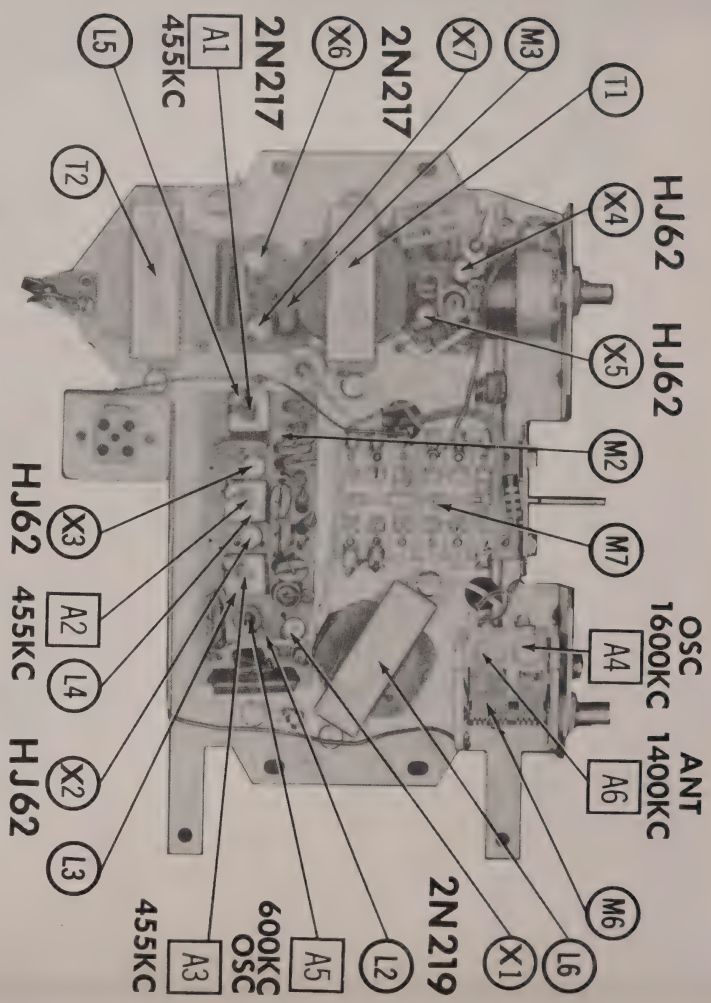
MISCELLANEOUS

ITEM No.	PART NAME	CROWN PART No.	NOTES
M6	Tuning Cap.		2 Gang
M7	Switch		Function (Pushbutton Type)
M8	Motor		Phono Drive (Part of Player)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder

CURTIS MATHES MODELS 1412C, 1512C, 1612C, 1712C, (Ch. 12C)

CURTIS MATHES MODELS 1412C, 1512C, 1612C, 1712C, (Ch. 12C)

MODEL 1712C

TRADE NAME	Curtis Mathes Models 1412C, 1512C, 1612C, 1712C (Ch. 12C)		
MANUFACTURER	Curtis Mathes Mfg., Co., 2220 Young Street, Dallas, Texas		
TYPE SET	AC Operated 18 Tube FM-AM Receiver With Stereo Amplifier And 4 Speed Automatic Record Changer		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	170 Watts, 1.5 Amp. @117 Volts AC
TUNING RANGE—BROADCAST	535 - 1620KC	FREQ. MOD.	88-108MC

FOR SERVICE INFORMATION ON RECORD CHANGER—SEE SIMILAR V-M 1201 — PHOTOFACT SET 436 FOLDER 18
OR RECORD CHANGER MANUAL RC-12

SET 498 FOLDER 6

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JN867

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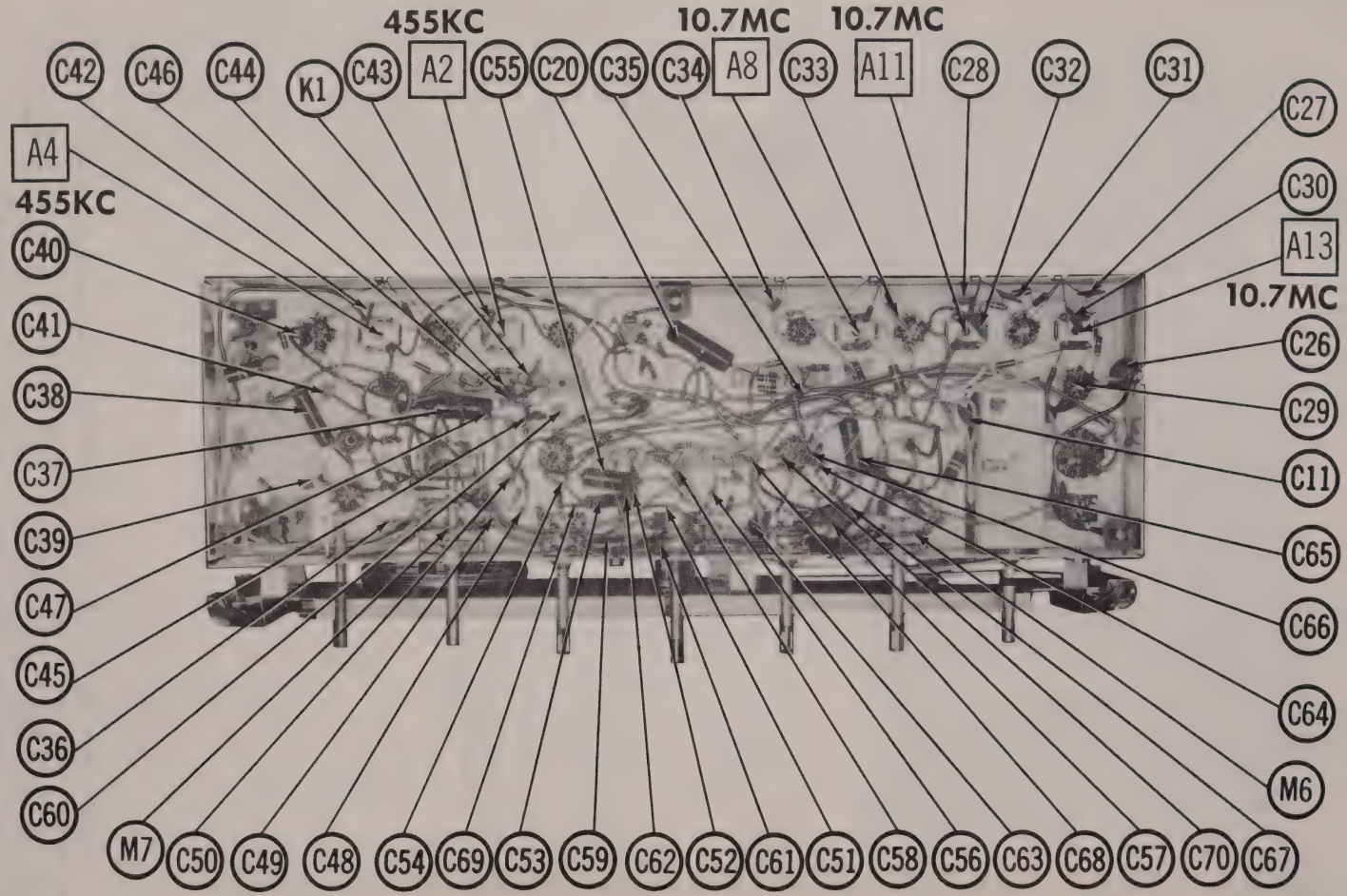
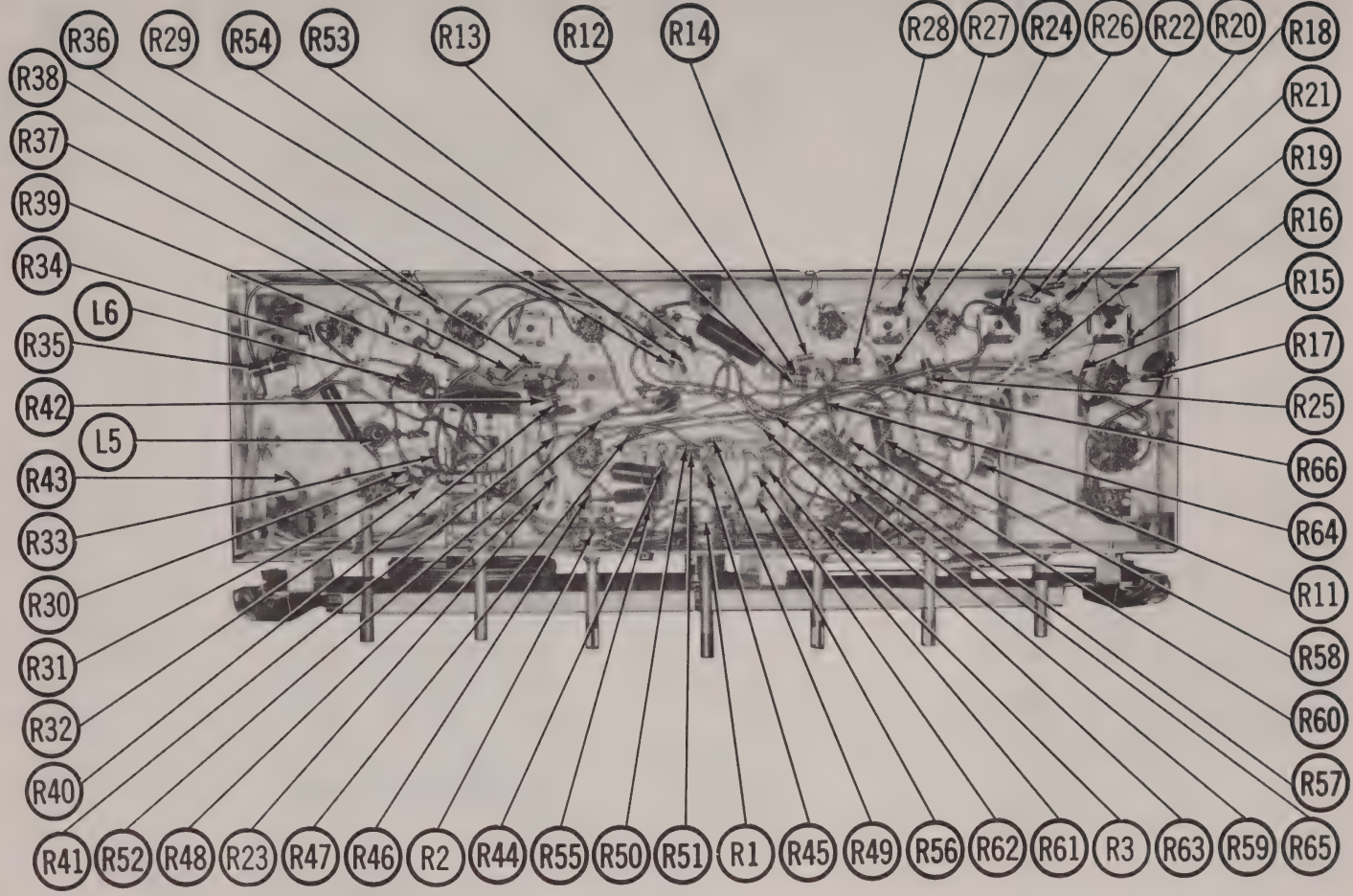
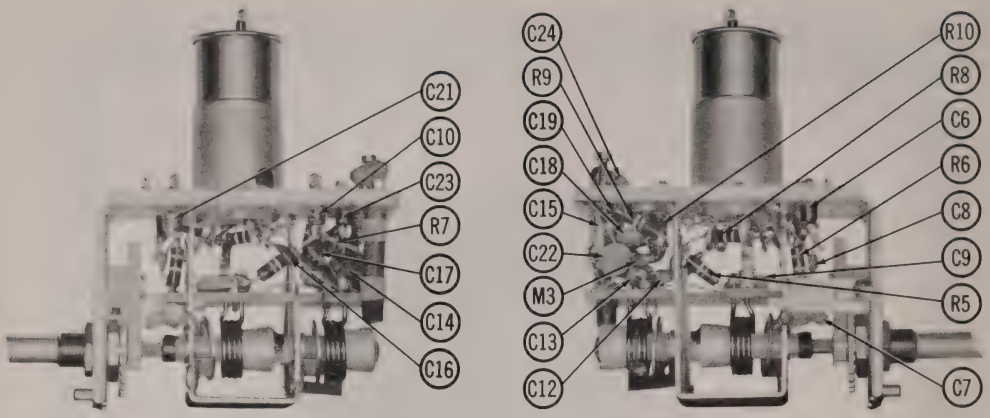


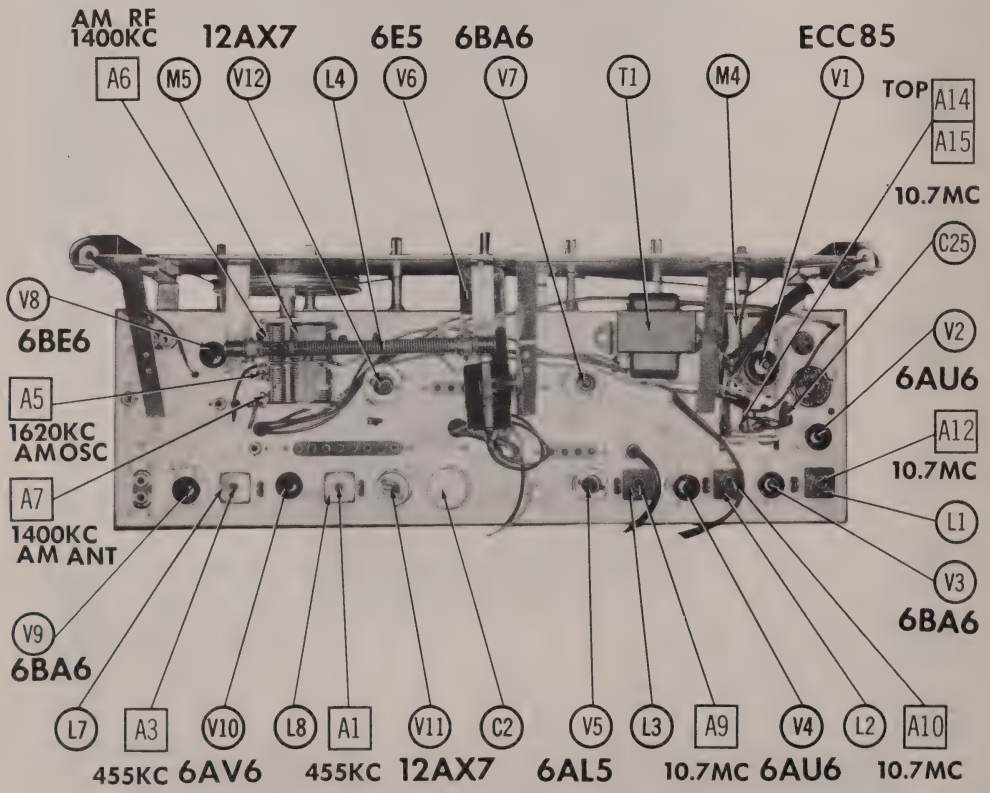
TUNER CHASSIS BOTTOM VIEW - ALIGNMENT, CAPACITOR & MISC. IDENT.



TUNER CHASSIS BOTTOM VIEW - RESISTOR & INDUCTOR IDENT.



FM RF SUBCHASSIS



TUNER CHASSIS - TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.
Suggested Alignment Tools: A1 thru A4, A8 thru A15... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A5, A6, A7..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

AM ALIGNMENT—SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ Mod.)	(AM) Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	1620KC	"	"	A5	"
3.	High side thru .1mfd to pin 1 (Grid) of AM RF Amp. Low side to chassis.	1400KC	Tune to 1400KC signal. Set pointer to 1400KC on dial.	"	A6	Adjust for maximum output while rocking tuning gang.
4.	Loop	"	Tune to 1400KC signal.	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru 5000mmf to pin 1 (grid) of FM Limiter. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe thru 1meg to point Ⓐ. Common to chassis.	A8	Adjust for maximum deflection.
6.	"	"	"	DC probe to point Ⓑ. Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
7.	Across FM Antenna terminals.	"	"	DC probe thru 1meg to point Ⓐ. Common to chassis.	A10, A11, A12, A13, A14, A15	Adjust for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru 5000mmf to pin 1 (grid) of FM Limiter. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. thru 27K to point Ⓐ. Low side to chassis.	A8	Adjust for maximum gain and symmetry of response similar to Fig. 1
6.	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A9	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of cross-over lines.
7.	Across FM antenna terminals.	"	"	Vert. amp. thru 27K to point Ⓐ. Low side to chassis.	A10, A11, A12, A13, A14, A15	Adjust for maximum gain and symmetry of response similar to Fig. 1

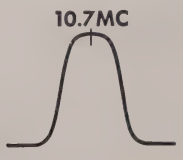


FIG. 1

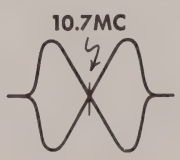
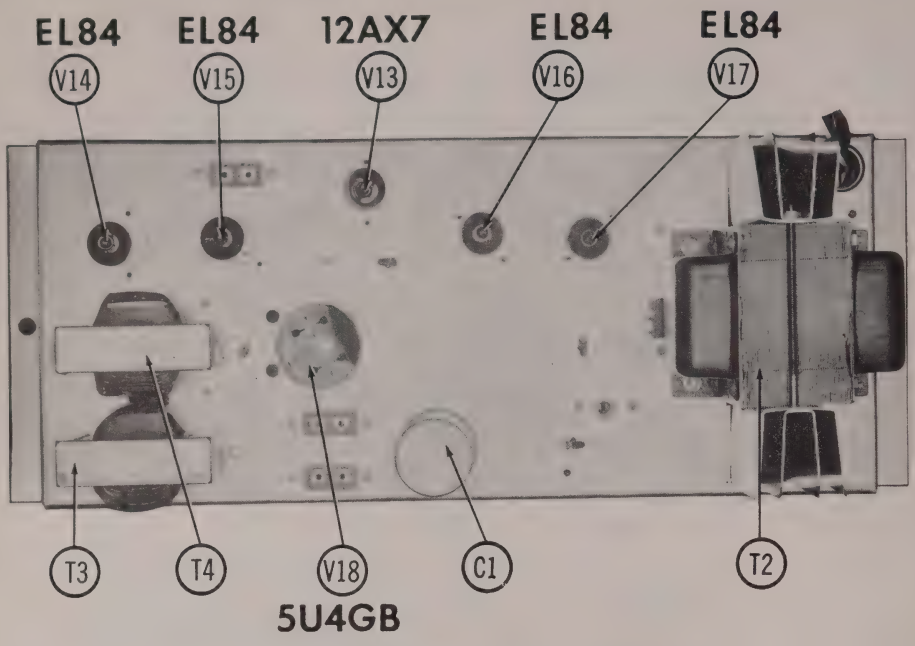
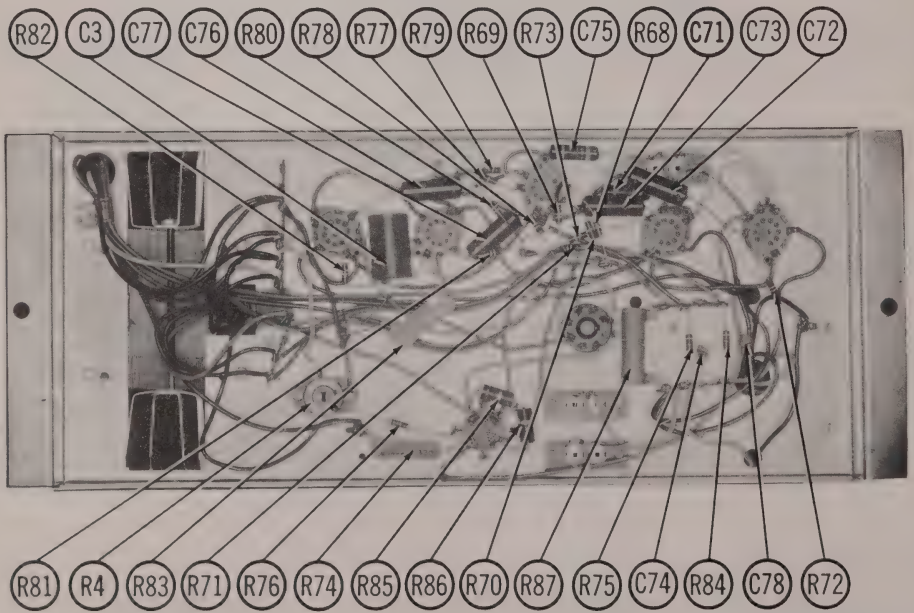


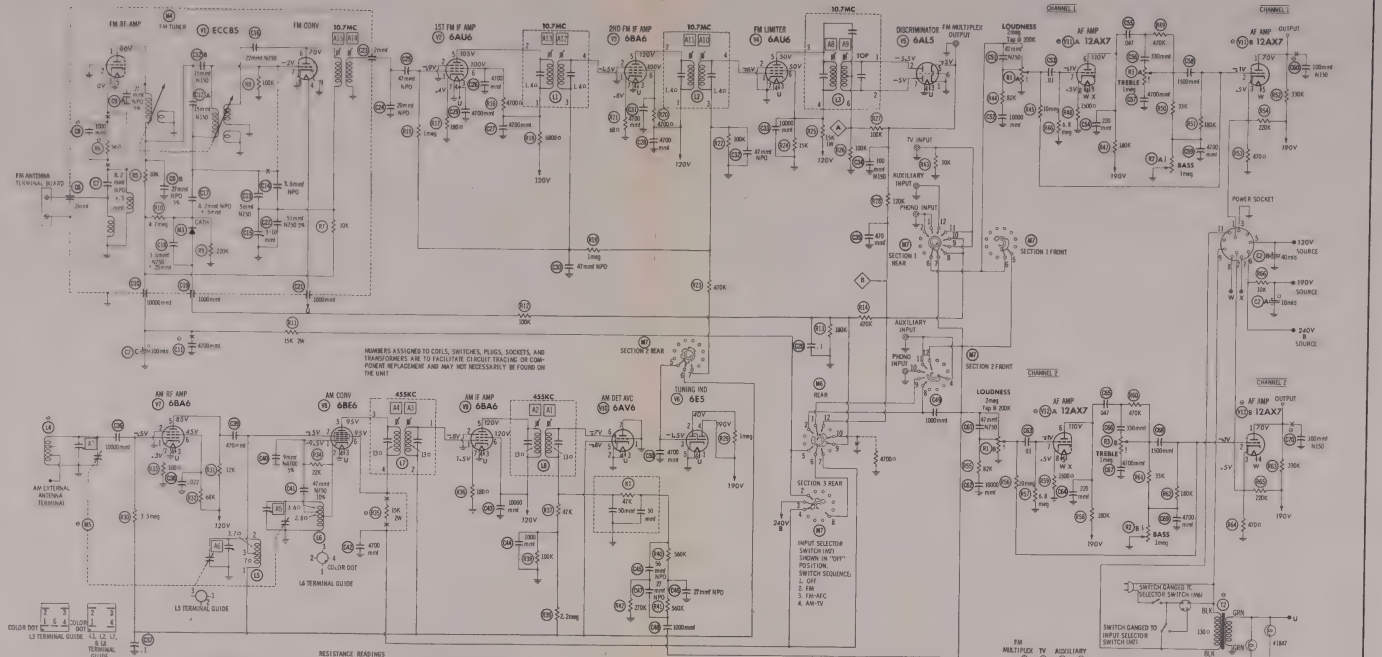
FIG. 2



AMP CHASSIS - TOP VIEW



AMP CHASSIS - BOTTOM VIEW



MEMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85 6AQ8	▽ZY	0Ω	360Ω	20Ω	0Ω	1.27K	100K	0Ω	0Ω
V2	6AU6	2.1meg	0Ω	0Ω	20Ω	↑13K	↑ 18K	180Ω		
V3	6BA6	1.1meg	0Ω	0Ω	20Ω	↑60000Ω	↑ 11K	68Ω		
V4	6AL6	180K	0Ω	0Ω	20Ω	↑10K	↑ 12K	0Ω		
V5	6AL5	0Ω	100K	0Ω	20Ω	250K	0Ω	100K		
V6	6E5	20Ω	↑1meg	570K ↓2.2meg	↑16K	0Ω	0Ω	NC		
V7	6BA6	↓5.6meg	0Ω	0Ω	20Ω	↓1.8K	↓74K	330Ω		
V8	6BE6	22K	56Ω	0Ω	20Ω	↓1.8K	↓1.8K	2.1meg		
V9	6BA6	2.1meg	0Ω	0Ω	20Ω	↑60000Ω	↑60000Ω	180Ω		
V10	6AV6	0Ω	0Ω	20Ω	0Ω	↓2.1meg	150K	0Ω		
V11	12AX7	↑345K	180K	470Ω	47K	47K	↑195K	6.8meg	1500Ω	47K
V12	12AX7	↑345K	180K	470Ω	47K	47K	↑195K	6.8meg	1500Ω	47K

SELECTOR SWITCH (AM) SHOWN IN "AM" POSITION. SWITCH SEQUENCE:
1. AM
2. FM
3. TV
4. RADIO STEREO
5. TV STEREO
6. AUXILIARY STEREO
7. PHONO STEREO
8. PHONO MONAURAL

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at minimum, no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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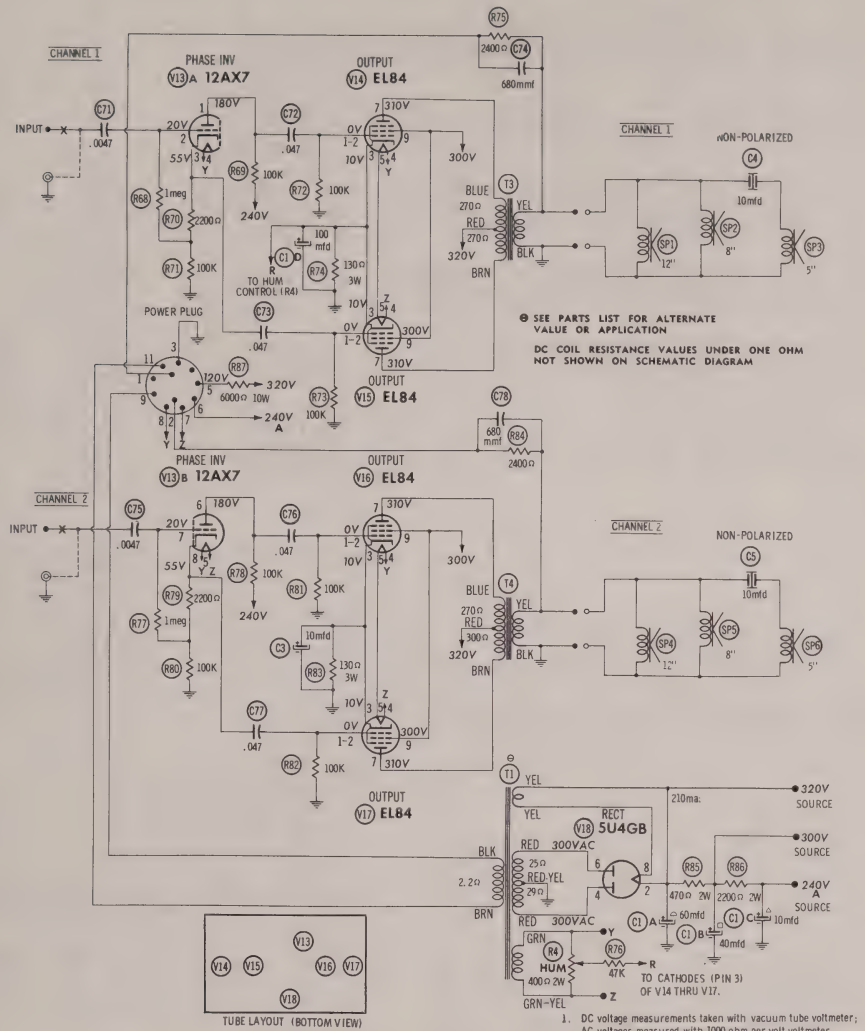
CURTIS MATHES MODELS 1412C, 1512C, 1612C, 1712C, (Ch. 12C)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.

RESISTANCE READINGS (Con't)

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V13	12AX7	†100K	1.1meg	100K	47K	47K	†100K	1.1meg	100K	NC
V14	EL84 6BQ5	100K	100K	130Ω	47K	47K	NC	†270Ω	NC	†470Ω
V15	EL84 6BQ5	100K	100K	130Ω	47K	47K	NC	†270Ω	NC	†470Ω
V16	EL84 6BQ5	100K	100K	130Ω	47K	47K	NC	†270Ω	NC	†470Ω
V17	EL84 6BQ5	100K	100K	130Ω	47K	47K	NC	†300Ω	NC	†470Ω
V18	5U4GB	NC	¶	NC	25Ω	NC	29Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 2 OF V18.
ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
MEASURED IN "AM" POSITION.
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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CURTIS MATHES MODELS 1412C, 1512C, 1612C, 1712C, (Ch. 12C)

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (CBS • GENERAL ELECTRIC • SYLVANIA)
V1	FM RF Amp. -Converter	ECC85/6AQ8
V2	1st FM IF Amplifier	6AU6
V3	2nd FM IF Amplifier	6BA6
V4	FM Limiter	6AU6
V5	Discriminator	6AL5
V6	Tuning Indicator	6E5
V7	AM RF Amplifier	6BA6
V8	AM Converter	6BE6
V9	AM IF Amplifier	6BA6

ITEM No.	USE	TYPE (RAYTHEON • SYLVANIA)
V10	AM Det. -AVC	6AV6
V11	Channel 1 AF Amp.	12AX7 (7025) *
V12	Channel 2 AF Amp.	12AX7 (7025) *
V13	Channel 1 Phase Inv. - Channel 2 Phase Inv.	12AX7
V14	Channel 1 Output	EL84/6BQ5
V15	Channel 1 Output	EL84/6BQ5
V16	Channel 2 Output	EL84/6BQ5
V17	Channel 2 Output	EL84/6BQ5
V18	Rectifier	5U4GB

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA: Curtis Mathes PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲60	400	4A4	AFH4-123	D0477.5	FP454.8	TMQ-107	TVL-4811	
B	■40	400							
C	▲10	400							
D	100	25							
C2A	■10	400	4A22	AFH3-30-35	C0260	FP376.3		TVLS-3693.2*	
B	40	400			BR1045	TC75			
C	▲10	400							
C3	100	25	4A6	PRS1270	BBR100-25	TC2501	TD-100-25	TVA-1207	
C4	10	25NP		PRS7315	BBR10-150	TCN5010		TVANS-1204.1*	
C5	10	25NP		PRS7315	BBR10-150	TCN5010		TVANS-1204.1*	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	2							
C7	8.2 NPO ± .5mmf		NPO-DI 8.2		C10V82C			10TCC-V82
C8	1000	Note 1	BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C9A	27 NPO 5%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
B	27 NPO 5%		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C10	1000		EF-001	MFT-1000		CCF-102	CT280A	
C11	4700	Note 1	BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C12A	15 N150					*		10TCP-Q15
B	15 N150					*		10TCP-Q15
C13	5 N750			DTN-5	C10V5U	CCTN-050	CN7-550	10TCU-V50
C14	3.6 NPO				C10V4C			10TCC-V39
C15	3-10			829-10				
C16	22 N750		N750-DI 22	DTN-22	C10Q22U	CCTN-220	CN7-422	10TCU-Q22
C17	8.2 NPO ± .5mmf		NPO-DI V8.2		C10V82C			10TCC-V82
C18	3.6 N750 ± .25mmf							
C19	1000		EF-001	MFT-1000		CCF-102	CT280A	
C20	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C21	1000		EF-001	MFT-1000		CCF-102	CT280A	
C22	51 N750 5%			TCN-51	C10Q51U			
C23	2							
C24	20 NPO		NPO-SI 20	TCZ-20	C10Q2C	CCTO-200	CNO-422	10TCC-Q20
C25	47 NPO		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47
C26	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C27	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C28	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C29	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C30	47 NPO		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47
C31	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C32	47 NPO		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C33	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C34	100 N150					*		10TCP-T10
C35	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C36	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C37	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C38	.022 400V		P288N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C39	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C40	9 N4700 5%					*		
C41	47 N750 10%		N750-DI 47	DTZ-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C42	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C43	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C44	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C45	56 NPO			TCZ-56	C10Q56C	CCTO-560	CNO-456	10TCC-Q56
C46	27 NPO		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C47	27 NPO		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C48	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C49	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C50	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C51	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C52	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C53	.01 200V		P288N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C54	220		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C55	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C56	330		BPD-00033	DD-331	L10T33	CCD-331	GP333	10TS-T33
C57	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C58	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C59	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C60	100 N150	Note 1				*		10TCP-T10
C61	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C62	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C63	.01 200V		P288N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C64	220		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C65	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C66	330		BPD-00033	DD-331	L10T33	CCD-331	GP333	10TS-T33
C67	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C68	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C69	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C70	100 N150	Note 1				*		10TCP-T10
C71	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C72	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C73	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C74	680		BPD-00068	DD-681	L10T68	CCD-681	B-368	10TS-T68
C75	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C76	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C77	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C78	680		BPD-00068	DD-681	L10T68	CCD-681	B-368	10TS-T68

Note 1. Not used in some versions.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Curtis Mathes PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg		2A34					Loudness, Channel 2
	200K Tap							
B	2meg							Loudness, Channel 1
	200K Tap							
R2A	1meg		2A19	B-70	AD47-1meg-Z		FA16A	Bass, Channel 1
B	1meg			SR-70	Not Req.		RU16A	Bass, Channel 2
C	Shaft			Not Req.	KSS-3		CS3500	
R3A	1meg		2A19	B-70	AD47-1meg-Z		FA16A	Treble, Channel 1
B	1meg			SR-70	Not Req.		RU16A	Treble, Channel 2
C	Shaft			Not Req.	KSS-3		CS3500	
R4A	400Ω	2(WW)	8A6	WN-401	A43-400	W11-202		Hum
B	Shaft			Not Req.	FKS-1/4	SK5		

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R5	10K	Note 1
R6	56Ω	
R7	10K	
R8	100K	
R9	220K	
R10	4.7meg	
R11	15K 2W	
R12	100K	
R13	180K	
R14	470K	
R15	1meg	
R16	4700Ω	
R17	180Ω	
R18	6800Ω	
R19	1meg	
R20	4700Ω	
R21	68Ω	
R22	100K	
R23	470K	
R24	15K	
R25	15K 1W	
R26	100K	
R27	100K	
R28	120K	
R29	1meg	
R30	3.3meg	
R31	12K	
R32	68K	

ITEM No.	RATING	REMARKS
R33	100Ω	
R34	22K	
R35	15K 2W	Note 1
R36	180Ω	
R37	47K	
R38	100K	
R39	2.2meg	
R40	560K	
R41	560K	
R42	270K	
R43	10K	
R44	82K	
R45	10meg	
R46	6.8meg	
R47	180K	
R48	1500Ω	
R49	470K	
R50	33K	
R51	180K	
R52	330K	
R53	470Ω	
R54	220K	
R55	82K	
R56	10meg	
R57	6.8meg	
R58	180K	
R59	1500Ω	
R60	470K	

ITEM No.	RATING	REMARKS
R61	33K	
R62	180K	
R63	330K	
R64	470Ω	
R65	220K	
R66	10K	
R67	100K	
R68	1meg	
R69	100K	
R70	2200Ω	
R71	100K	
R72	100K	
R73	100K	
R74	130Ω 3W	#8A3
R75	2400Ω	
R76	47K	
R77	1meg	
R78	100K	
R79	2200Ω	
R80	100K	
R81	100K	
R82	100K	
R83	130Ω 3W	#8A3
R84	2400Ω	
R85	470Ω 2W	
R86	2200Ω 2W	
R87	6000Ω 10W	#8A10

Note 1. Not used in some versions.
Curtis Mathes Part Number.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	RATING SEC.	REPLACEMENT DATA Curtis Mathes PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	117V @ .24A	6.3V @ 3.5A	12A7 ①			P-6456			① Not used when T1 is Part #12A8.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Curtis Mathes PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T3	4500Ω CT	3-4Ω	10A3-A	24S42	A-2905	AU-609	A-3880	24S42	S-57Z	
T4	4500Ω CT	3-4Ω	10A3-1	24S42	A-2905	AU-609	A-3880	24S42	S-57Z	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Curtis Mathes PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	12"	PM	3-4Ω	12LB-38A	12A6A	
SP2	8"	PM	6-8Ω	8EV-39	8A1Z8.4	
SP3	5"	PM	6-8Ω	5CU-98	5A15Z7.8	
SP4	12"	PM	3-4Ω	12LB-38A	12A6A	
SP5	8"	PM	6-8Ω	8EV-39	8A1Z8.4	
SP6	15"	PM	6-8Ω	5CU-98	5A15Z7.8	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Curtis Mathes PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	2nd FM IF Trans.	1A32	16-3487	16-3487	FM-254	1463		
L2	3rd FM IF Trans.	1A32	16-3487	16-3487	FM-254	1463		
L3	Discriminator	1A33	17-3494	17-3494	FM-253	1464		
L4	Loopstick	1A35 ①	14-7002	14-7002	BC-418	71-RF		
L5	AM RF Coil	1A34						
L6	AM Osc. Coil	1A32						
L7	1st AM IF Trans.	1A4	16-6758	16-6758	BC-352	12-C1	RF-1	
L8	2nd AM IF Trans.	1A5	16-6758	16-6758	BC-353	12-C2	RF-2	

① Some versions use Part #1A11.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Curtis Mathes PART No.	REPLACEMENT DATA	
K1	AM Diode RF Filter	50mmf, 50mmf, 47K		Aerovox	PA-99
				Centralab	PC-52
				Cornell-Dubilier	1117M3
				Sprague	D-3

PHONO CARTRIDGE

ITEM No.	Curtis Mathes PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE
M1		13T		13		A-44X		10TR-S	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	RATING SEC. 5	REPLACEMENT DATA Curtis Mathes PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ 1.26A	600 VCT @ .210A	5V @ 3A	12.6V @ 2A			12A2B ①				P-8352		

① Some versions combine T1 and T2 in one unit (Part #12A8).

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	Curtis Mathes PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	REMARKS
M2		* W-204DS † or * W-204DD-1 ♦	* A-44X † or * A-44XSD †♦ * A-44XDD ♦	† Jewel ♦ Diamond * Includes Cartridge

CURTIS MATHES MODELS 1412C, 1512C, 1612C, 1712C, (Ch. 12C)

PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Curtis Mathes PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M3						FM AFC Diode (Part of FM Tuner)

MISCELLANEOUS

ITEM No.	PART NAME	Curtis Mathes PART No.	NOTES
M4	Tuner	3A6 ①	FM
M5	Tuning Cap.		AM, 3 Gang (Ant. 35-550mmf, RF 12-240mmf, Osc. 16-117mmf)
M6	Switch		Function, (Includes Off-On) (Rotary Wafer Type)
M7	Switch		Input Selector (Rotary Wafer Type)

① Early versions use 3A4.

CABINETS & CABINET PARTS

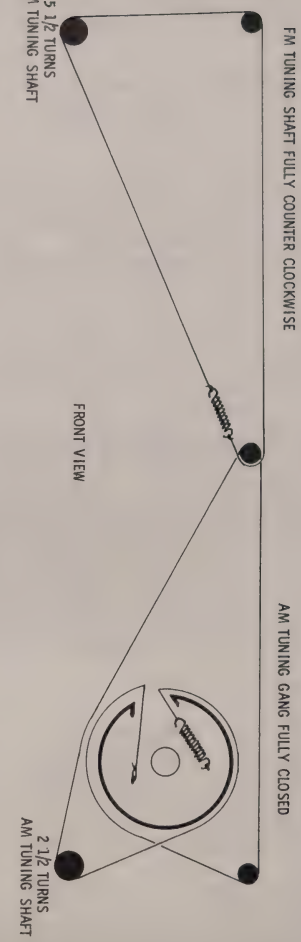
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	11B4	FM AM Tuning
Knob	11B2	Level Control (Front)
Knob	11B7-1	Level Control (Rear)
Knob	11B3	Function Switch, Treble, Bass
Dial Glass	2B7	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

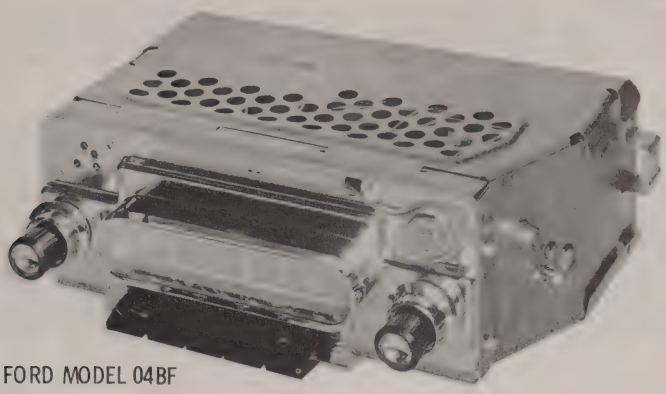
DIAL CORD STRINGING



PHOTOFACT® Folder with CIRCUITRACE®

EDSEL MODEL 04BE
FORD MODEL 04BF

EDSEL MODEL 04BE
FORD MODEL 04BF



FORD MODEL 04BF

TRADE NAME	Edsel Model 04BE (COKF-18805, COKF-18806) For 1960 Edsel Automobiles Ford Model 04BF (COAZ-18805, COAF-18806) For 1960 Ford Automobiles (Early Versions Only)
MANUFACTURER	Bendix Radio Div., Bendix Aviation Corp., Baltimore 4, Maryland
TYPE SET	Battery Operated 4 Tube, 2 Transistor Custom Built Automobile AM Receiver
POWER SUPPLY	12 Volt Storage Battery
TUNING RANGE—BROADCAST	535 - 1605KC RATING 1 Amp. @ 12.6 Volts DC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools: A1 thru A4.....GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A5, A6.....GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537
A8, A9, A10.....See Fig. 2

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	262.5KC (400~ Mod.)	High end stop.	DC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	Thru dummy (Fig. 1) to antenna receptacle.	1605KC	"	"	A5, A6, A7	"
	Step 3 is not necessary unless tuning coils have been replaced or tampered with. If necessary, back tuning cores (A8, A9 and A10) out of coils but not out of coil forms. Repeat Step 2.					
3.	Thru dummy (Fig. 1) to antenna receptacle.	1200KC	Tuner carriage .285" from high freq. end stop.	DC probe to point (A). Common to chassis.	A8, A9, A10	Adjust for maximum deflection. Repeat Steps 2 and 3 until no further improvement is noted. Cement cores.
	With radio installed in car and antenna fully extended, tune in a weak station near 1000KC and adjust A7 for maximum output.					

PUSHBUTTON ADJUSTMENT

1. Tune manually to desired station.
2. Pull button out, then press in firmly.
3. Repeat for remaining buttons.

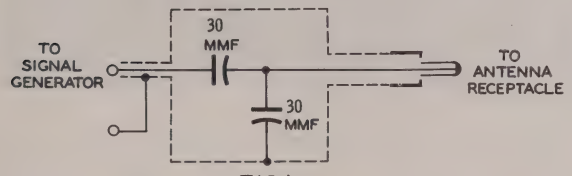


FIG. 1

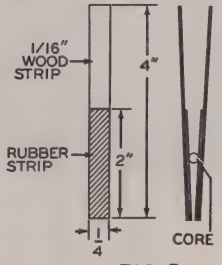


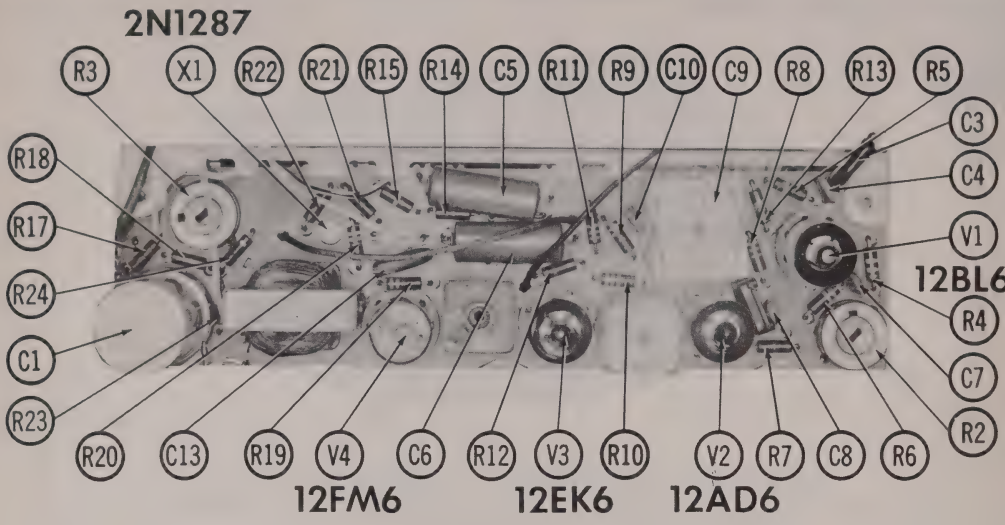
FIG. 2

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

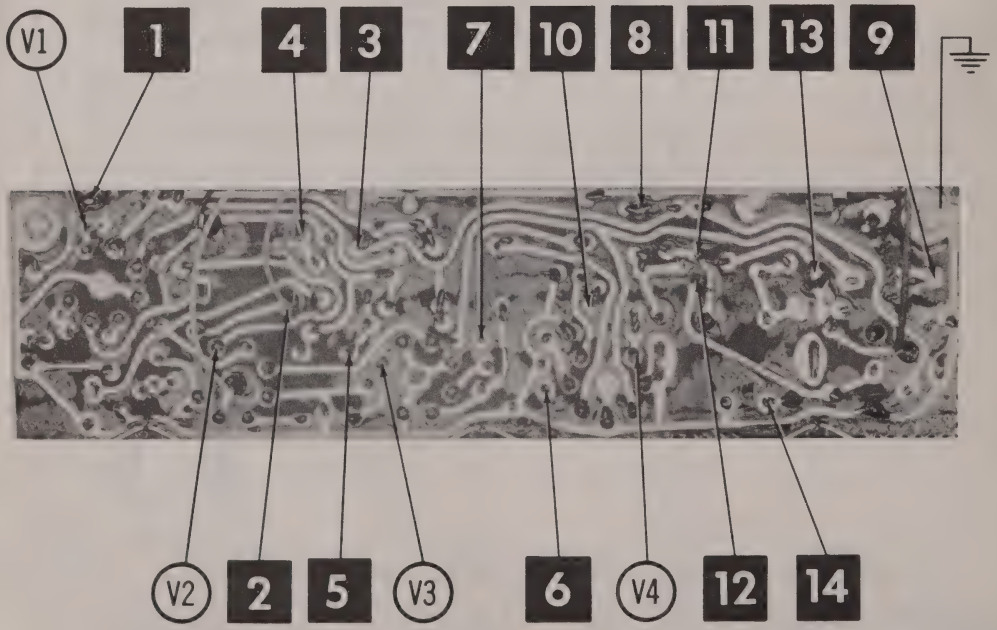
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JD921

SET 498 FOLDER 7



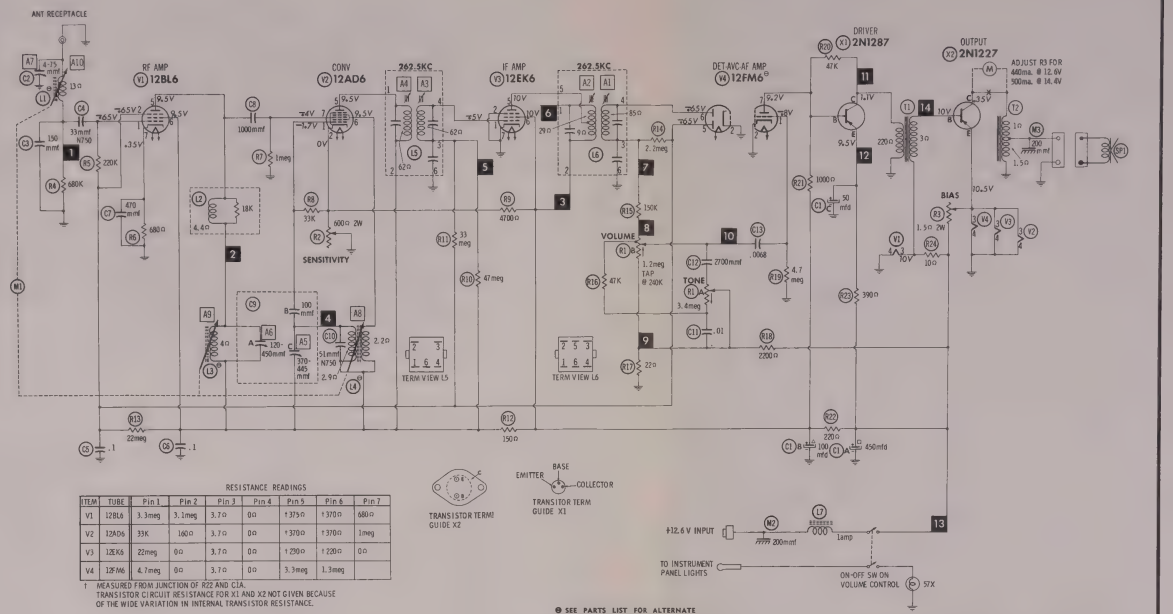
PRINTED BOARD-TOP VIEW



A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BL6	3.3meg	3.1meg	3.7Ω	0Ω	†375Ω	†370Ω	680Ω
V2	12AD6	33K	160Ω	3.7Ω	0Ω	†370Ω	†370Ω	1meg
V3	12EK6	22meg	0Ω	3.7Ω	0Ω	†230Ω	†220Ω	0Ω
V4	12FM6	4.7meg	0Ω	3.7Ω	0Ω	3.3meg	1.3meg	

† MEASURED FROM JUNCTION OF R22 AND C1A. TRANSISTOR CIRCUIT RESISTANCE FOR X1 AND X2 NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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EDSEL MODEL 04BE
FORD MODEL 04BF

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	CBS • GENERAL ELECTRIC • USE	TYPE	ITEM No.	RAYTHEON • SYLVANIA • USE	TYPE
V1	RF Amplifier	12BL6	V3	IF Amplifier	12EK6
V2	Converter	12AD6	V4	Det. -AVC-AF Amp.	12FM6 (12FK6) *

* Alternate

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA: CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
X1	2N1287	Driver	2N1227		2N362		PNP
X2	2N1227	Output					PNP Note 1

Note 1. When replacing, apply silicone grease to both sides of insulator.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: BENDIX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■450	16	220353-16	PWH3-00-93		PWP300.3		PC1S-3022 *	
B	▲100	16							
C	50	16							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	4-75	219083-1 †				462		
C3	150		1468-00015	DD-151	5W5T15	CM-19B-151M	MC235	MS-315
C4	33 N750		N750-DI 33	DTN-33	C10Q33U	CCTN-330	CN7-433	10TCU-Q33
C5	.1 100V		P288N-1	DF-104	CUB2P1	1DP-2-104	GEM-201	2TM-P1
C6	.1 100V		P288N-1	DF-104	CUB2P1	1DP-2-104	GEM-201	2TM-P1
C7	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C8	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C9A	120-450	219092-2 †	NPO-DI 100	DTZ-100	C10T1C	CCTO-101	CNO-310	10TCC-T10
B	100							
C	370-445							
C10	51 N750		N750-DI 47	TCN-51	C10Q51U	CCTN-470	CN7-447	10TCU-Q47
C11	.1 100V		P288N-1	DF-104	CUB2P1	1DP-2-104	GEM-201	2TM-P1
C12	2700		DI-2700	DD-272	BYA10D27	CCD-272	B-227	10TS-D27
C13	.0068 100V		P288N-0068	D6-682	CUB6D68	6DP-1-682	GEM-6268	6TM-D68

† Bendix Part Number.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: BENDIX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3.4meg	1/2	2090405-1					
B	1.2meg 240K Tap	1/2				† QJ-1275A	■ UE4137-S	Tone Volume
C	Switch							Power, Off-On
R2	600Ω	2(WW)	2090181-2			110-600	PFL600	Sensitivity
R3	1.5Ω	2(WW)	2090181-8				PFL1.5	Bias

† "Concentrikit" equivalent: K-6 kit with base elements and shafts: B11-140, P14-102 (Panel); B13-136X, R1-113 (Rear); 76-2 (Switch); R5 (Retainer)

■ "STA-LOC" equivalent: FB36L, RU125T254, OS1000A, IS1500, US42.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	680K	
R5	220K	
R6	680Ω	
R7	1meg	
R8	33K	
R9	4700Ω	
R10	47meg	

ITEM No.	RATING	REMARKS
R11	33meg	
R12	150Ω	
R13	22meg	
R14	2.2meg	
R15	150K	
R16	47K	
R17	22Ω	

ITEM No.	RATING	REMARKS
R18	2200Ω	
R19	4.7meg	
R20	47K	
R21	1000Ω	
R22	220Ω	
R23	390Ω	
R24	10Ω	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: BENDIX PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Ant. Coil	†						† Part of M1 Includes 18K
L2	RF Choke	2090088-6						
L3	RF Coil	†						
L4	Osc. Coil	†						
L5	Input IF Trans.	2090907-5						
L6	Output IF Trans.	2090908-4						
L7	"A" Lead Choke	216188-18						

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	BENDIX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	6	1	2090433-1						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE	REPLACEMENT DATA							NOTES
	PRI.	BENDIX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	20Ω Tap ⓐ 8-10Ω	2090849-1							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	BENDIX PART No.	QUAM PART No.	
SP1	6"x 9"	PM	8-10Ω	2091269-6	69A2Z8.5	

MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
M1	Tuner	2090383-2	Complete, Includes Pushbuttons
M2	Spark Plate	220267-9	200mmf
M3	Spark Plate	220267-9	200mmf
	Printed Board	2090468-1	Less Tubes
	Printed Board	2091152-2	(Tone Comp.) Small

CABINETS & CABINET PARTS

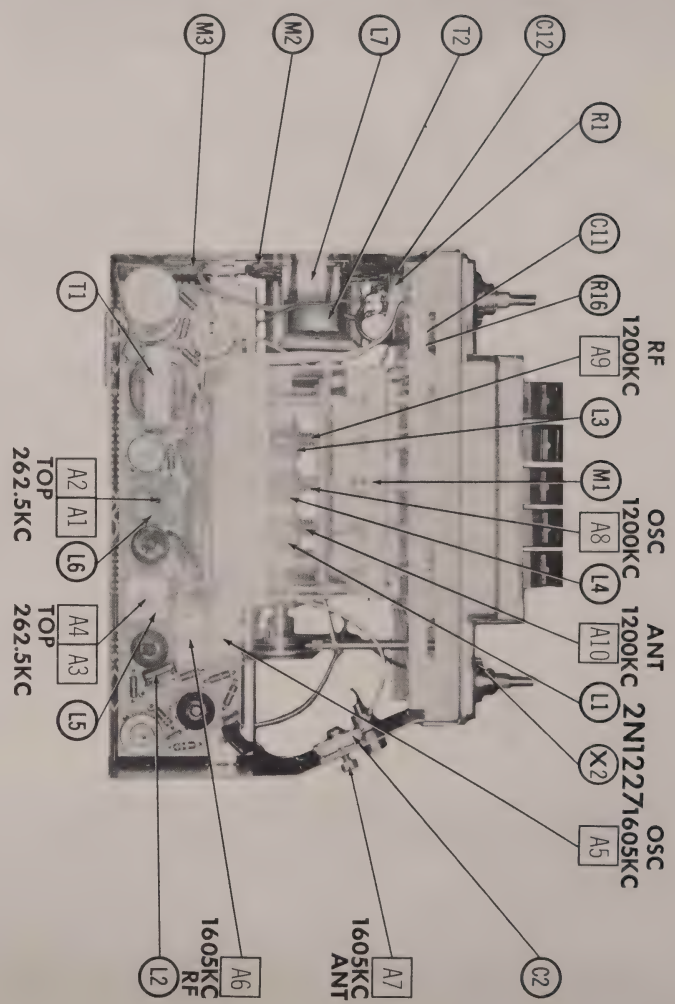
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	2090413-1	Tuning, Volume; Model 04BF
Knob	2090436-1	Tuning, Volume; Model 04BE
Pushbutton	2090381-1	
Pointer Ass'y.	2090129-17	(RCC)
Pointer Ass'y.	2090129-18	(GIC)
Dial Glass	2090409-1	Calibrated, Model 04BF
Dial Glass	2090477-1	Calibrated, Model 04BE

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire	Use BELDEN No. 8885
Bonding Strap	Use BELDEN No. 8661

CHASSIS—TOP VIEW



PHOTOFACT® Folder

EMERSON MODEL 914B
(Ch. 120482B, C, 120483B)

EMERSON MODEL 914B
(Ch. 120482B, C, 120483B)

EMERSON MODEL 914B
(Ch. 120482B, C, 120483B)

TRADE NAME	Emerson Model 914B (Tuner Ch. 120482B, C; Amp. Ch. 120483B)		
MANUFACTURER	Emerson Radio & Phono Corp., 524 W. 23rd Street, New York 11, N. Y.		
TYPE SET	AC Operated 8 Tube FM-AM Tuner, 9 Tube Stereo Amplifier, And 4 Speed Automatic Record Changer		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	185 Watts, 1.7 Amp. @117 Volts AC (FM-AM)
TUNING RANGE—BROADCAST	535 - 1650KC	FREQ. MOD.	88 - 108MC

FOR SERVICE INFORMATION ON RECORD CHANGER—SEE SIMILAR GLASER-STEERS GS-77 — PHOTOFACT SET 399 FOLDER 7 OR RECORD CHANGER MANUAL RC-11

SET498 FOLDER 8

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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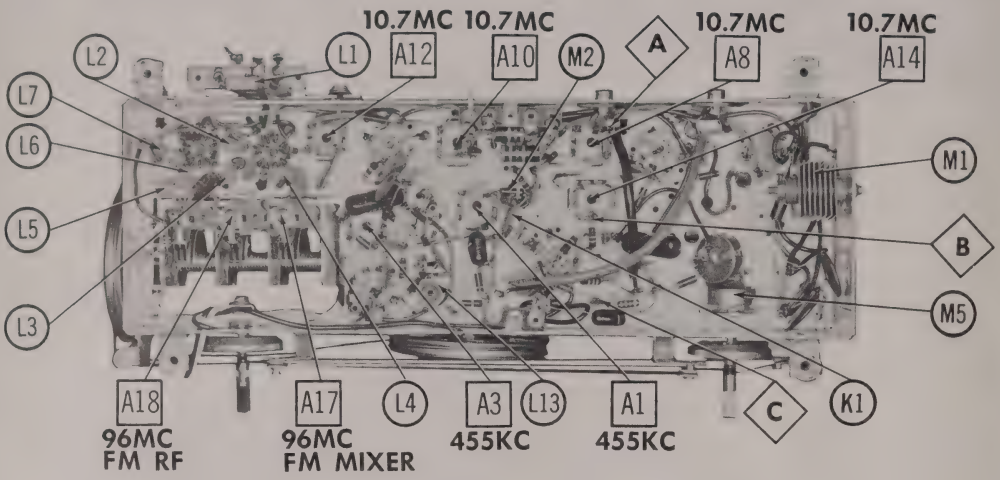
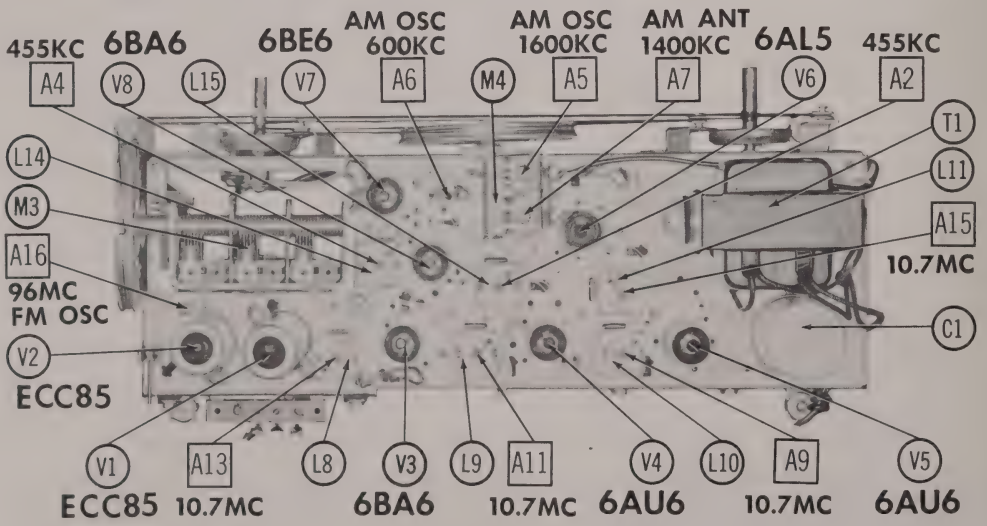


TUNER CHASSIS BOTTOM VIEW - ALIGN., INDUCTOR & MISC. IDENT.



TUNER CHASSIS - TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.

Suggested Alignment Tools:

A1 thru A4, A8 thru A15....	GENERAL CEMENT #5097, 8727 WALSCO #2515
A5, A6, A16, A17, A18.....	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A7.....	GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440 WALSCO #2526, 2543, 2544, 2545

AM ALIGNMENT—SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .01mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ Mod.)	(AM) Tuning gang fully open.	AC probe across AM Audio Output jack.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	1600KC	1600KC	"	A5	"
3.	"	600KC	600KC	"	A6	"
4.	Loop	1400KC	Tune to 1400KC signal.	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .01mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe to point (A). Common to chassis.	A8, A9, A10, A11, A12, A13	Adjust for maximum deflection.
6.	"	"	"	DC probe thru 1meg to point (B). Common to chassis.	A14	"
7	"	"	"	DC probe to point (C). Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .01mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. to point (A). Low side to chassis.	A8, A9, A10, A11, A12, A13	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
6.	"	"	"	Vert. amp. thru 47K to point (B). Low side to chassis.	A14	"
7.	"	"	"	Vert. amp. to point (C). Low side to chassis.	A15	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A14 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	High side thru 270Ω to FM antenna terminal. Low side to chassis.	96MC (Unmod.)	(FM) 96MC	DC probe to point (A). Common to chassis.	A16, A17, A18	Adjust for maximum deflection.

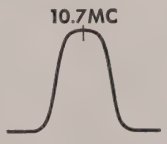


FIG. 1

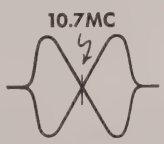


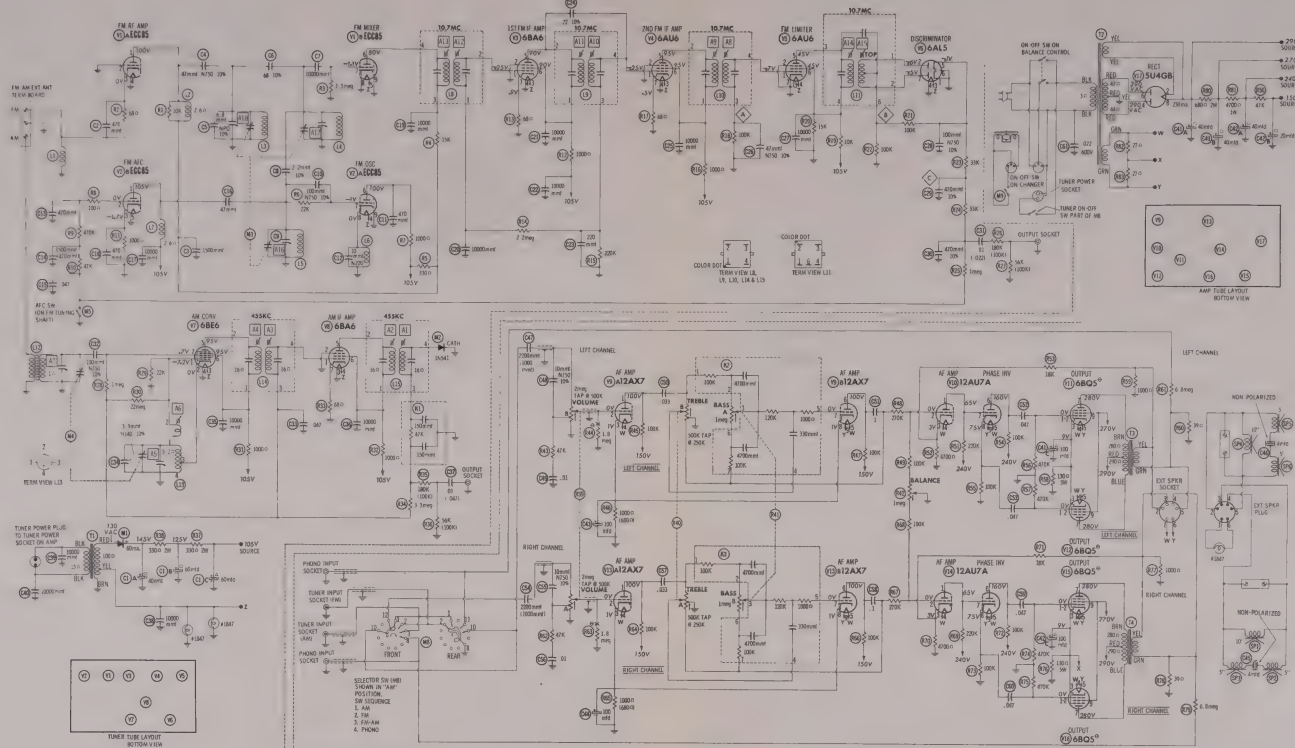
FIG. 2

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85 6AQ8	†990Ω	0Ω	68Ω	0Ω	.3Ω	†16K	3.3meg	0Ω	0Ω
V2	ECC85 6AQ8	†660Ω	520K ■1.8meg	1000Ω	.3Ω	0Ω	†1600Ω	22K	.7Ω	0Ω
V3	6BA6	2.4meg	0Ω	.3Ω	0Ω	†1600Ω	†1600Ω	68Ω		
V4	6AU6	220K	0Ω	.3Ω	0Ω	†1600Ω	†1600Ω	68Ω		
V5	6AU6	100K	0Ω	0Ω	.3Ω	†11K	†11K	0Ω		
V6	6AL5	0Ω	100K	.3Ω	0Ω	200K	0Ω	100K		
V7	6BE6	22K	.6Ω	.3Ω	0Ω	†1600Ω	†1600Ω	4.5meg		
V8	6BA6	3.5meg	0Ω	0Ω	.3Ω	†1600Ω	†1600Ω	68Ω		
V9	12AX7	††150K	0Ω	1000Ω	140Ω	140Ω	††150K	380K	1000Ω	140Ω
V10	12AU7A	††225K	280K	4200Ω	140Ω	140Ω	††105K	††225K	100K	140Ω
V11	6BQ5	470K	470K	130Ω	140Ω	140Ω	NC	††280Ω	NC	††680Ω
V12	6BQ5	470K	470K	130Ω	140Ω	140Ω	NC	††290Ω	NC	††680Ω
V13	12AX7	††150K	0Ω	1000Ω	140Ω	140Ω	††150K	380K	1000Ω	140Ω
V14	12AU7A	††225K	280K	4200Ω	140Ω	140Ω	††105K	††225K	100K	140Ω
V15	6BQ5	470K	470K	36Ω	140Ω	140Ω	NC	††280Ω	NC	††680Ω
V16	6BQ5	470K	470K	36Ω	140Ω	140Ω	NC	††290Ω	NC	††680Ω
V17	5U4GB	NC	¶	NC	44Ω	NC	47Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM OUTPUT OF M1.
†† MEASURED FROM PIN 8 OF V17.
■ MEASURED IN "AFC OFF" POSITION.

NC NO CONNECTION



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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EMERSON MODEL 914B
(Ch. 120482B, C, 120483B)

TUNER PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆		GENERAL ELECTRIC ◆		RAYTHEON ◆		SYLVANIA ◆
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	FM RF Amp.-Mixer	ECC85/6AQ8	V5	FM Limiter	6AU6
V2	FM Osc.-FM AFC	ECC85/6AQ8	V6	Discriminator	6AL5
V3	1st FM IF Amplifier	6BA6	V7	AM Converter	6BE6
V4	2nd FM IF Amplifier	6AU6	V8	AM IF Amplifier	6BA6

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	200	925482	AFH3-21	C0194	FP326.4	TMD-22	TVL-4609	
B	■60	200				TC77	TD-40-250		
C	▲60	200							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C3	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C4	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C5	6.8 NPO 10%		NPO-DI 6.8	DTZ-6R8	C10V68C	CCTO-6R8	CNO-568	10TCC-V68
C6	.68 10%		NPO-SI .68	TCZ-R68				
C7	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C8	2.2 10%		NPO-SI 2.2	TCZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C9								
C10	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C11	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C12	10 N220					*		10TCR-Q10
C13	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C14	1500	(470) †	BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C15	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C16	47		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C17	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C18	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C19	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C20	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C22	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C23	220		DI-220	DD-221	L10T22	CCD-221	B-322	10TS-T22
C24	.22 10%							
C25	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C26	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C27	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C28	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C29	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C30	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C31	.01 400V	(.022) †	P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C32	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C33	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C34	3.3 N140 10%					*		
C35	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C36	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C37	.01 400V	(.047) †	P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C38	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C39	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C40	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10

† Alternate Value.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	10K	
R2	68Ω	
R3	3.3meg	
R4	15K	
R5	330Ω	
R6	22K	
R7	1000Ω	
R8	100Ω	
R9	470K	
R10	47K	
R11	1000Ω	
R12	1000Ω	
R13	68Ω	

ITEM No.	RATING	REMARKS
R14	2.2meg	
R15	220K	
R16	1000Ω	
R17	68Ω	
R18	100K	
R19	10K	
R20	15K	
R21	100K	
R22	100K	
R23	33K	
R24	33K	
R25	1meg	
R26	180K	(100K) *

ITEM No.	RATING	REMARKS
R27	56K	(100K) *
R28	1meg	
R29	22K	
R30	22meg	
R31	1000Ω	
R32	1000Ω	
R33	68Ω	
R34	3.3meg	
R35	180K	(100K) *
R36	56K	(100K) *
R37	330Ω 2W	
R38	330Ω 2W	

* Alternate Value.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	EMERSON PART No.	REPLACEMENT DATA	
K1	AM Diode Filter	150mmf, 150mmf, 47K	923096	Aerovox	PA-98
				Centralab	PC-51
				Cornell-Dubilier	1117M2
				Sprague	D-2

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		EMERSON PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Ant. Coil		19-2003	19-2003		4584		.24uh ①
L2	RF Choke		19-1003	19-1003	BC-564	4608		3.3uh ①
L3	FM RF Coil							
L4	FM Mixer Coil							
L5	FM Osc. Coil	716124						
L6	Cathode Choke		19-1000	19-1000	BC-561	4602		1uh ①
L7	RF Choke		19-1003	19-1003	BC-564	4608		3.3uh ①
L8	1st FM IF Trans.	720326	16-3487	16-3487	FM-254	1463		
L9	2nd FM IF Trans.	720327	16-3487	16-3487	FM-254	1463		
L10	3rd FM IF Trans.	720327	16-3487	16-3487	FM-254	1463		
L11	Discriminator	708347	17-3494	17-3494	FM-253	1464		
L12	Loopstick	700155	14-9003	14-9003	BC-419	705-A		
L13	AM Osc. Coil	716122	14-1073	14-1073	BC-393	70-OSC		
L14	1st AM IF Trans.	720075	16-6758	16-6758	BC-352	12-C1	RF-1	
L15	2nd AM IF Trans.	720075	16-6758	16-6758	BC-353	12-C2	RF-2	

① IRC Part #CLA.

TUNER PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING		REPLACEMENT DATA						
	PRI.	SEC. 1 SEC. 2	EMERSON PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .41A	130V @ .060A Tap @ 6.3V @ 2.9A	730089						

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT (Measured)	EMERSON PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.060A	817083 *	T100 *	1235AH *	100A *	SR200 ♦	* Selenium ♦ Silicon

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		EMERSON PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N541	817085	1N636	1N295	1N295	AM Detector (Pigtail)

MISCELLANEOUS

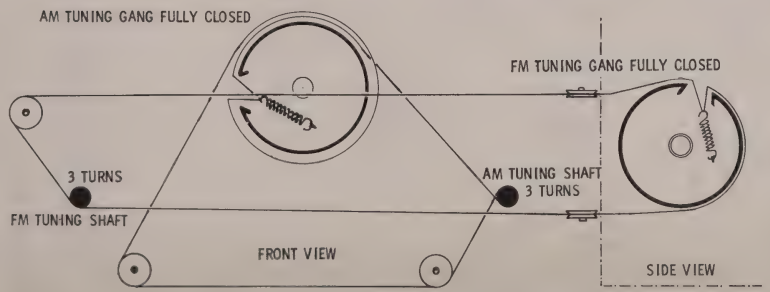
ITEM No.	PART NAME	EMERSON PART No.	NOTES
M3	Tuning Cap.	900193	FM, 3 Gang
M4	Tuning Cap.	900194	AM, 2 Gang
M5	Switch		AFC Off-On (SPST Push Off-On Type)

WIRING DATA

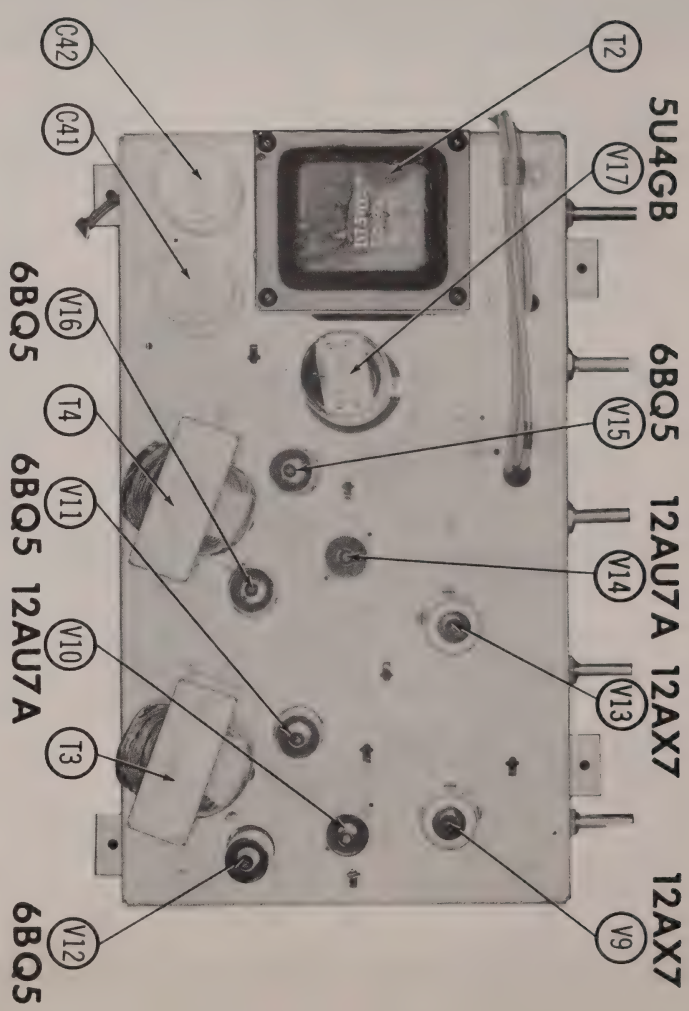
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

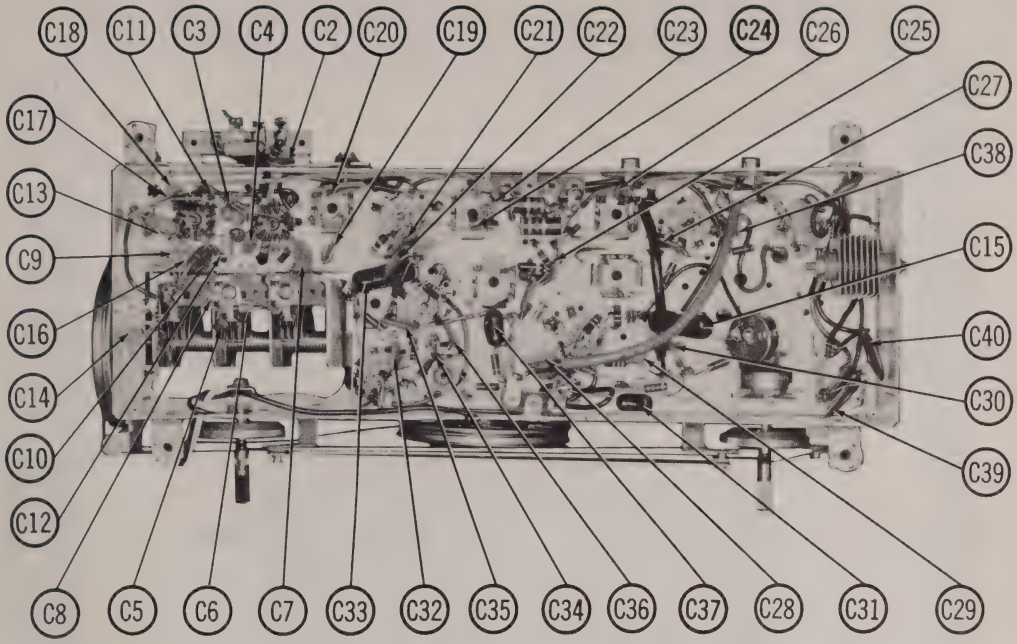
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

DIAL CORD STRINGING

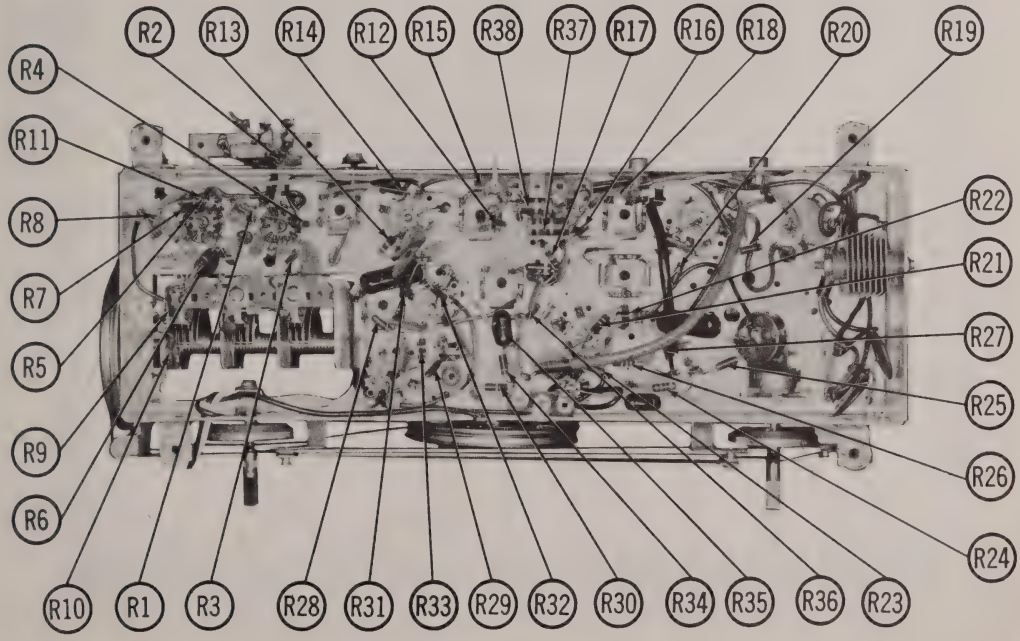


AMP CHASSIS - TOP VIEW

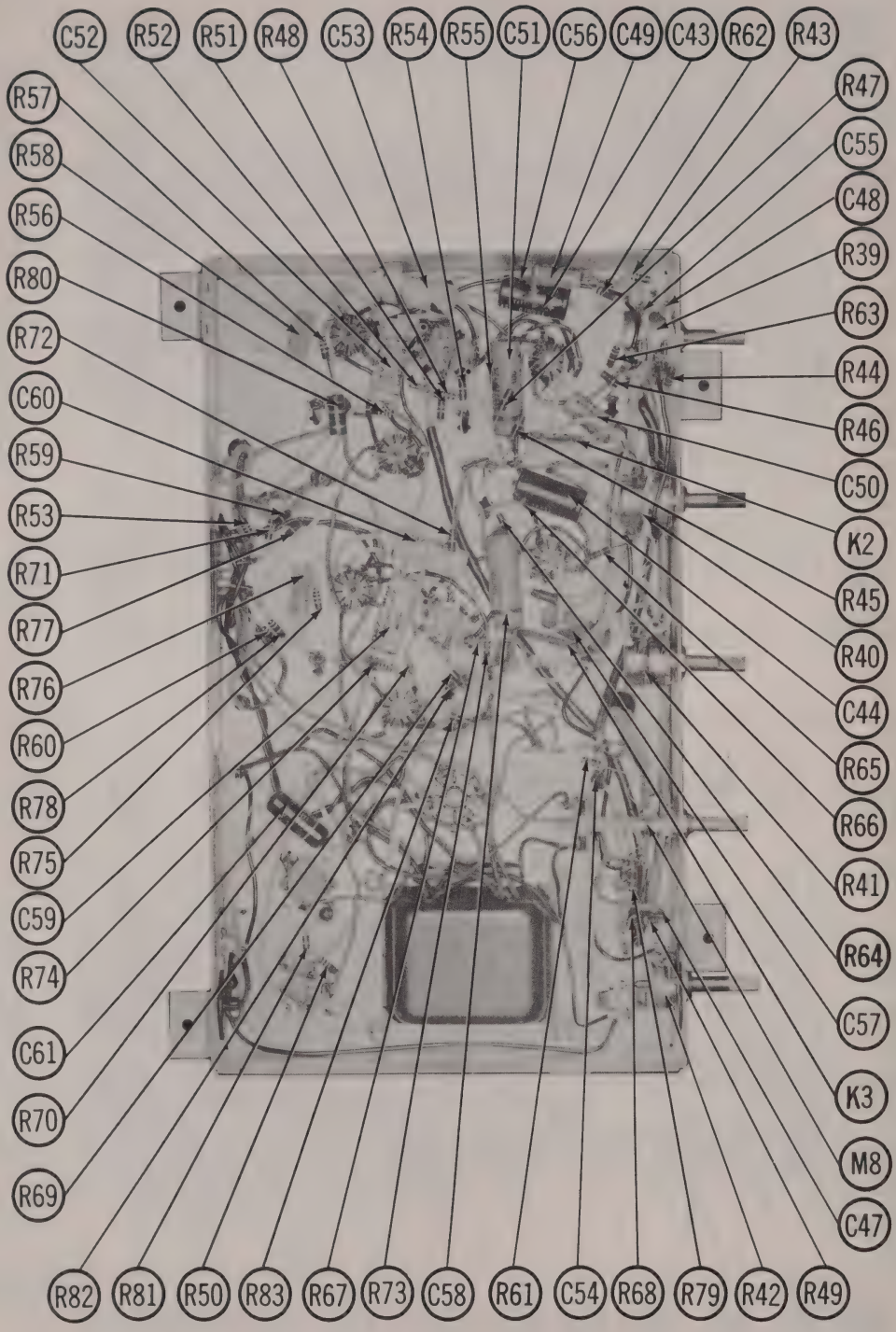




TUNER CHASSIS BOTTOM VIEW—CAPACITOR IDENT.



TUNER CHASSIS BOTTOM VIEW—RESISTOR IDENT.



AMP. CHASSIS—BOTTOM VIEW

AMP PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆			◆ RAYTHEON ◆ SYLVANIA ◆		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V9	Left Channel AF Amp.	12AX7	V13	Right Channel AF Amp.	12AX7
V10	Left Channel AF Amp. - Left Channel Phase Inv.	12AU7A	V14	Right Channel AF Amp. - Right Channel Phase Inv.	12AU7A
V11	Left Channel Output	6BQ5 (EL84/6BQ5)*	V15	Right Channel Output	6BQ5 (EL84/6BQ5) *
V12	Left Channel Output	6BQ5 (EL84/6BQ5)*	V16	Right Channel Output	6BQ5 (EL84/6BQ5)*
			V17	Rectifier	5U4GB

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C41A	▲40	400	925483	AFH3-142	C1090	FP238	TMD-43	TVL-2764	
B	■40	400				TC3501	TMT-140	TVA-1310	
C	▲100	50							
C42A	▲40	400	925484	AFH3-139-50	C1036	FP367	TMD-53	TVL-2762	
B	■20	400					TMT-140	TVA-1310	
C	▲100	50							
C43	100	25		SRE25V100	BBR100-25	TC2501	TD-100-25	TE-1211	
C44	100	25		SRE25V100	BBR100-25	TC2501	TD-100-25	TE-1211	
C45	4	15NP	925391	NP-PRS7405	BBR4-150	TCN504		TVANS-1150*	
C46	4	15NP	925391	NP-PRS7405	BBR4-150	TCN504		TVANS-1150*	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	EMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C47	2200	(1000) †	BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C48	10 N750 10%		N750-DI 10	DTN-10	C10Q1C	CCTN-100	CN7-410	10TCU-Q10
C49	.01 200V		P288N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C50	.033 400V		P488N-033	DD-303	CUB6S33	4DP-2-333	GEM-4133	6TM-S33
C51	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C52	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C53	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C54	2200	(1000) †	BPD-0022	DD-222	BYA10D22	CCD-222	B-222	5HK-D22
C55	10 N750 10%		N750-DI 10	DTN-10	C10Q1C	CCTN-100	CN7-410	10TCU-Q10
C56	.01 200V		P288N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C57	.033 400V		P488N-033	DD-303	CUB6S33	4DP-2-333	GEM-4133	6TM-S33
C58	.1 400V		P488N-1	DF-104	CUB4P1	4DP-1-103	GEM-401	4TM-P1
C59	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C60	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C61	.022 600V		P688N-022	DD-203	CUB6S22	6DP-2-223	GEM-4122	6TM-S22

† Alternate Value.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA EMERSON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R39A	2meg 500K Tap	½	390609				FA26T55 *	Volume, Right Channel
B	2meg 500K Tap	½					RU26T55 *	Volume, Left Channel
R40A	500K 250K Tap	½	390608	BT-65				Treble, Right Channel
B	500K 250K Tap	½		STR-65				Treble, Left Channel
R41A	1meg	½	390606	B-69	AD47-1meg-S		FA16L	Bass, Left Channel
B	1meg	½		SR-69	Not Req.		RU16L	Bass, Right Channel
C	Shaft			Not Req.	FS-3		CS3500	
R42A	1meg	½	390607					Balance
B	Switch							Power Off-On

* Use Shaft CS3500.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R43	47K	
R44	1.8meg	Note 1
R45	100K	
R46	1000Ω	(680Ω) *
R47	100K	
R48	270K	
R49	100K	
R50	47K	
R51	220K	
R52	4700Ω	
R53	18K	
R54	100K	
R55	100K	
R56	470K	

ITEM No.	RATING	REMARKS
R57	470K	
R58	130Ω 5W	
R59	1000Ω	
R60	39Ω	
R61	6.8meg	
R62	47K	
R63	1.8meg	Note 1
R64	100K	
R65	1000Ω	(680Ω) *
R66	100K	
R67	270K	
R68	100K	
R69	220K	
R70	4700Ω	

ITEM No.	RATING	REMARKS
R71	18K	
R72	100K	
R73	100K	
R74	470K	
R75	470K	
R76	130Ω 5W	
R77	1000Ω	
R78	39Ω	
R79	6.8meg	
R80	680Ω 2W	
R81	4700Ω 1W	
R82	27Ω	
R83	27Ω	

Note 1. Not used in some versions.
* Alternate Value.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	EMERSON PART No.	REPLACEMENT DATA	
K2	Tone Comp.	330mmf, 4700mmf, 4700mmf, 1000Ω, 120K, 100K, 100K	923043	Sprague	TC-24
K3	Tone Comp.	330mmf, 4700mmf, 4700mmf, 1000Ω, 120K, 100K, 100K	923043	Sprague	TC-24

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA EMERSON PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	117V ⓐ 1.3A	580 VCT ⓐ .230A	5V ⓐ 3A	730090	26R40	P-2867		P-8164	26R40	
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ⓐ 4.3A									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA EMERSON PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T3	6700Ω CT	6-8Ω	734184	24S16	A-2905	AU-609①	A-3870①	24S16	S-57Z①	
T4	6700Ω CT	6-8Ω	734184	24S16	A-2905	AU-609①	A-3870①	24S16	S-57Z①	

① Drill New Mounting Hole.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA EMERSON PART No.	QUAM PART No.	NOTES
SP1	10"	PM	6-8Ω	180214	10A6AZ7.8	
SP2	5"	PM	3-4Ω	180215	5A1	
SP3	5"	PM	3-4Ω	180215	5A1	
SP4	10"	PM	6-8Ω	180214	10A6AZ7.8	
SP5	5"	PM	3-4Ω	180215	5A1	
SP6	5"	PM	3-4Ω	180215	5A1	

AMP PARTS LIST AND DESCRIPTIONS (Continued)

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							
	EMERSON PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M6		13TB		26S	S1-1 S3-3	53	J43 & J47X	8TA4-S	N-8TA-S

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	EMERSON PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M7		W-103STSS † or W-103STDS †♦	S-69X † or S-69XSD †♦ or S-69XDD ♦	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M8	Switch		Function Selector
M9	Switch		Changer Off-On (Part of Changer)
M10	Switch		Stereo-Monaural (Part of Changer)
M11	Motor		Phono Drive (Part of Changer)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial	520267	Glass
Knob	461210	Loudness, Bass, Treble, Balance, Function Selector
Knob	461211	Tuning, FM- FM-AFC Switch

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT® Folder

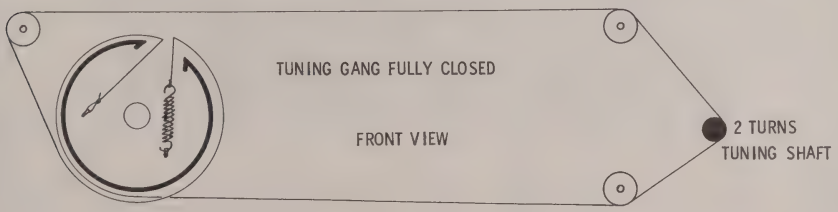
HARMONY MODEL TA-20

HARMONY MODEL TA-20

HARMONY MODEL TA-20

TRADE NAME	Harmony Model TA-20		
MANUFACTURER	Continental Mfg., Inc., 1612 California Street, Omaha, Nebraska		
TYPE SET	AC Operated 8 Tube FM-AM Tuner		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	27 Watts, .29 Amp. @ 117 Volts AC (FM) 21 Watts, .22 Amp. @ 117 Volts AC (AM)
TUNING RANGE—BROADCAST	520 - 1670KC		

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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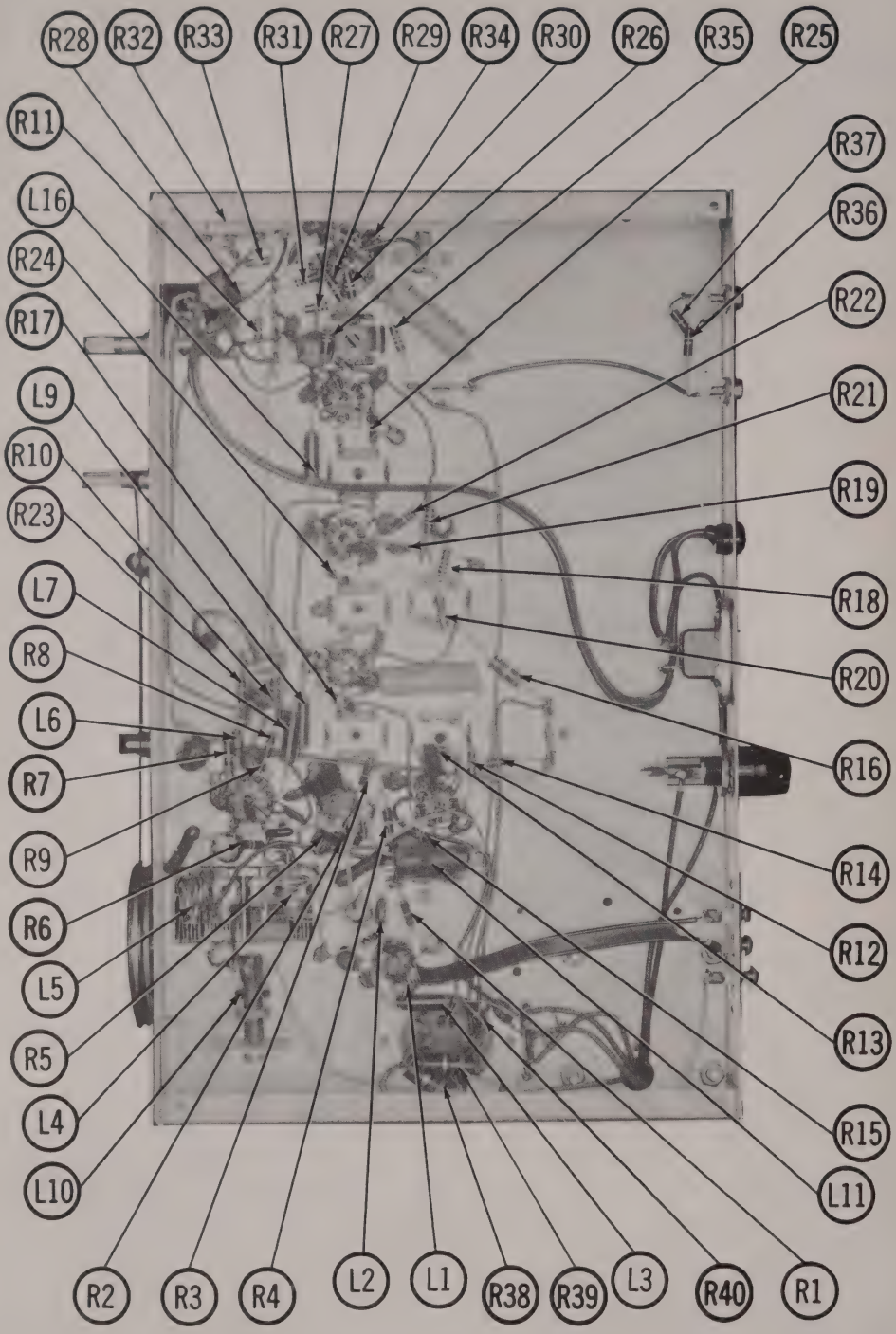
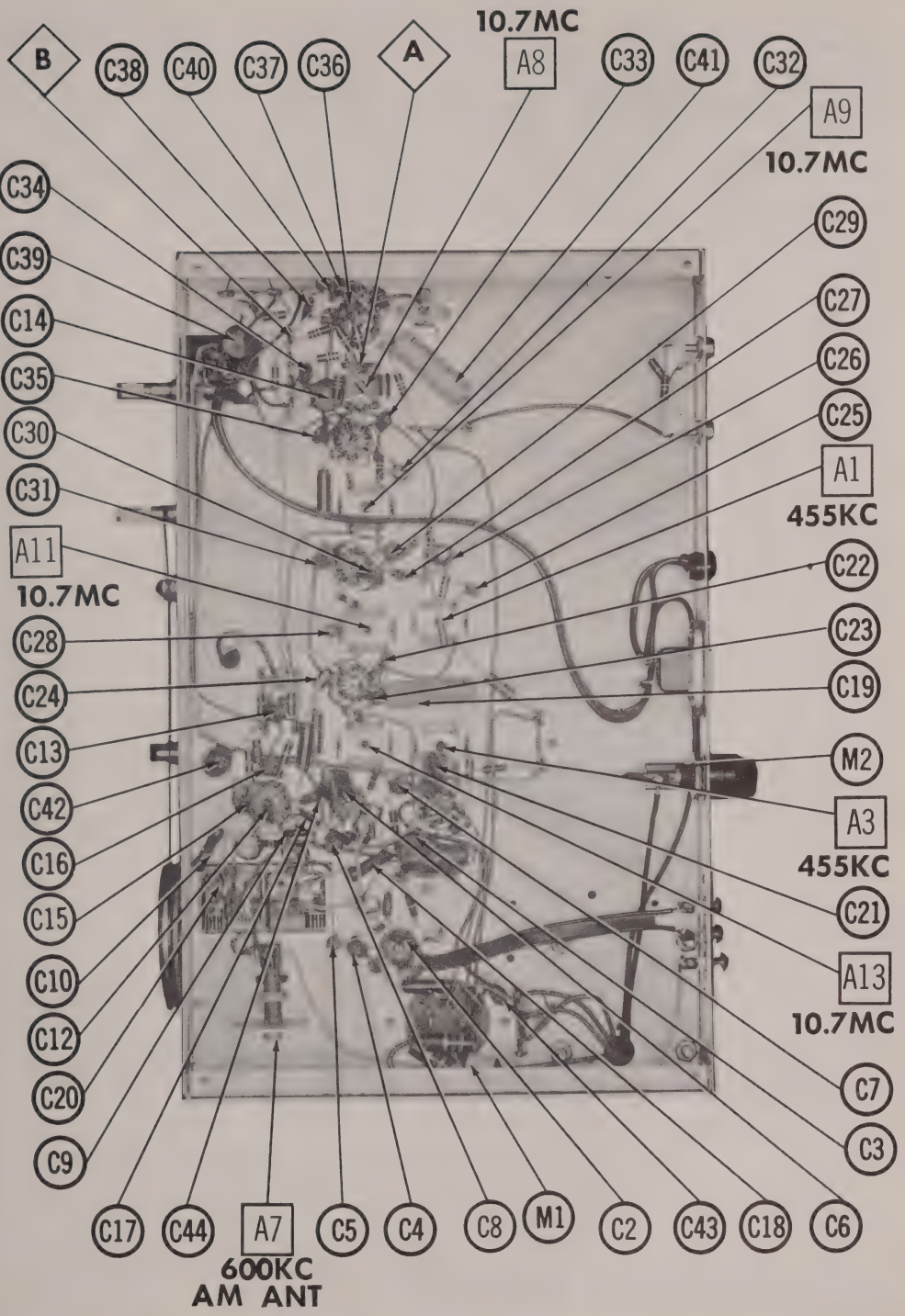
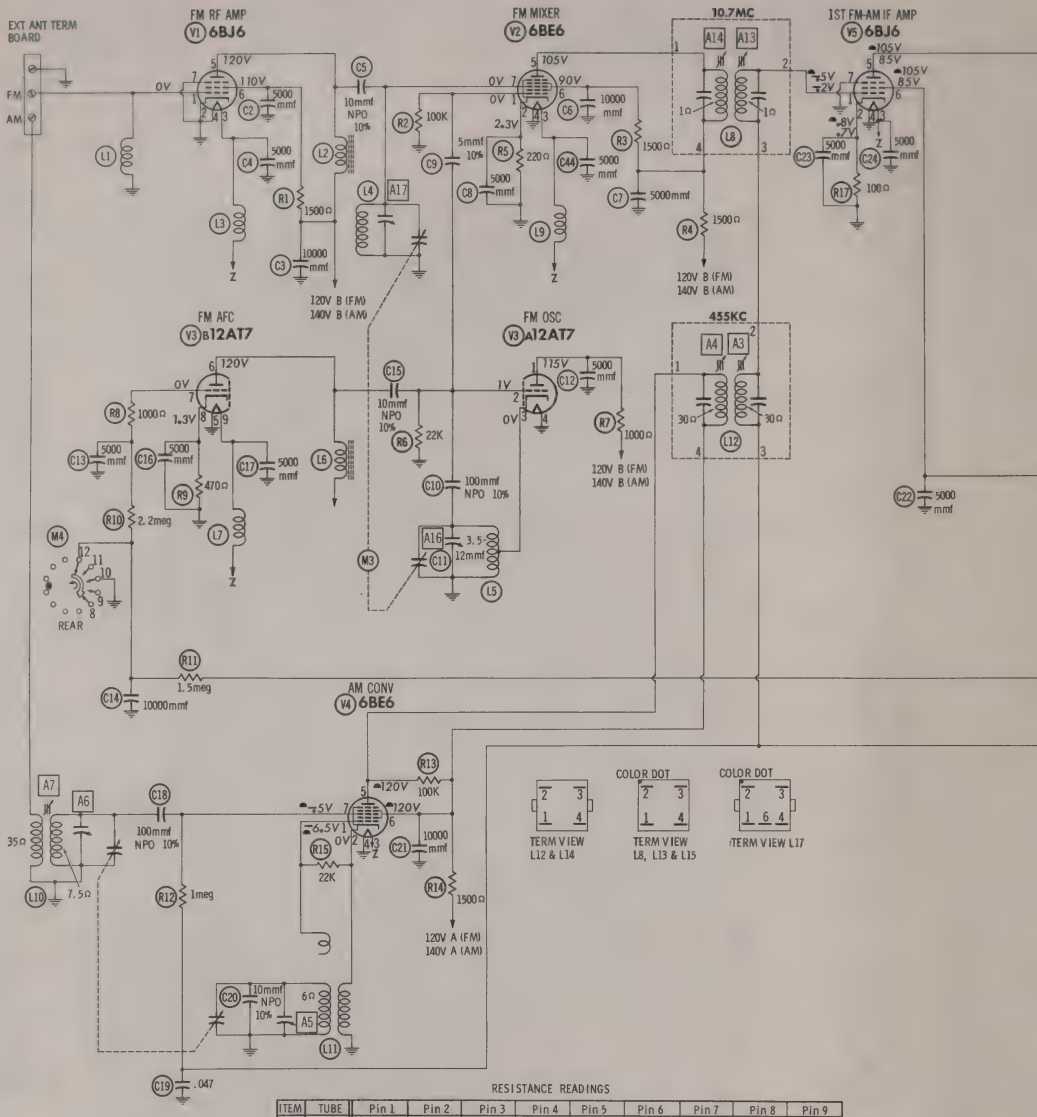


CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



CHASSIS BOTTOM VIEW - ALIGNMENT, CAPACITOR & MISC. IDENT.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BJ6	0Ω	0Ω	.5Ω	0Ω	†540Ω	†2000Ω	0Ω		
V2	6BE6	100K	220Ω	.5Ω	0Ω	†2000Ω	†3500Ω	.1Ω		
V3	12AT7	†1500Ω	22K	0Ω	0Ω	0Ω	†540Ω	3.9meg ▪2.2meg	470Ω	.6Ω
V4	6BE6	22K	.6Ω	.5Ω	0Ω	†▬2000Ω	†▬2000Ω	▬3.4meg		
V5	6BJ6	2.4meg	100Ω	.5Ω	0Ω	†5200Ω	†5200Ω	0Ω		
V6	6BH6	160K	100Ω	.5Ω	0Ω	†2000Ω	†2000Ω	0Ω		
V7	6BH6	100K	0Ω	.6Ω	0Ω	†40K	†40K	0Ω		
V8	6T8A	100K	100K	200K	0Ω	.6Ω	0Ω	0Ω	10meg	†270K

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
■ MEASURED IN "FM AFC" POSITION.
▬ MEASURED IN "AM" POSITION.
† MEASURED FROM OUTPUT OF M1.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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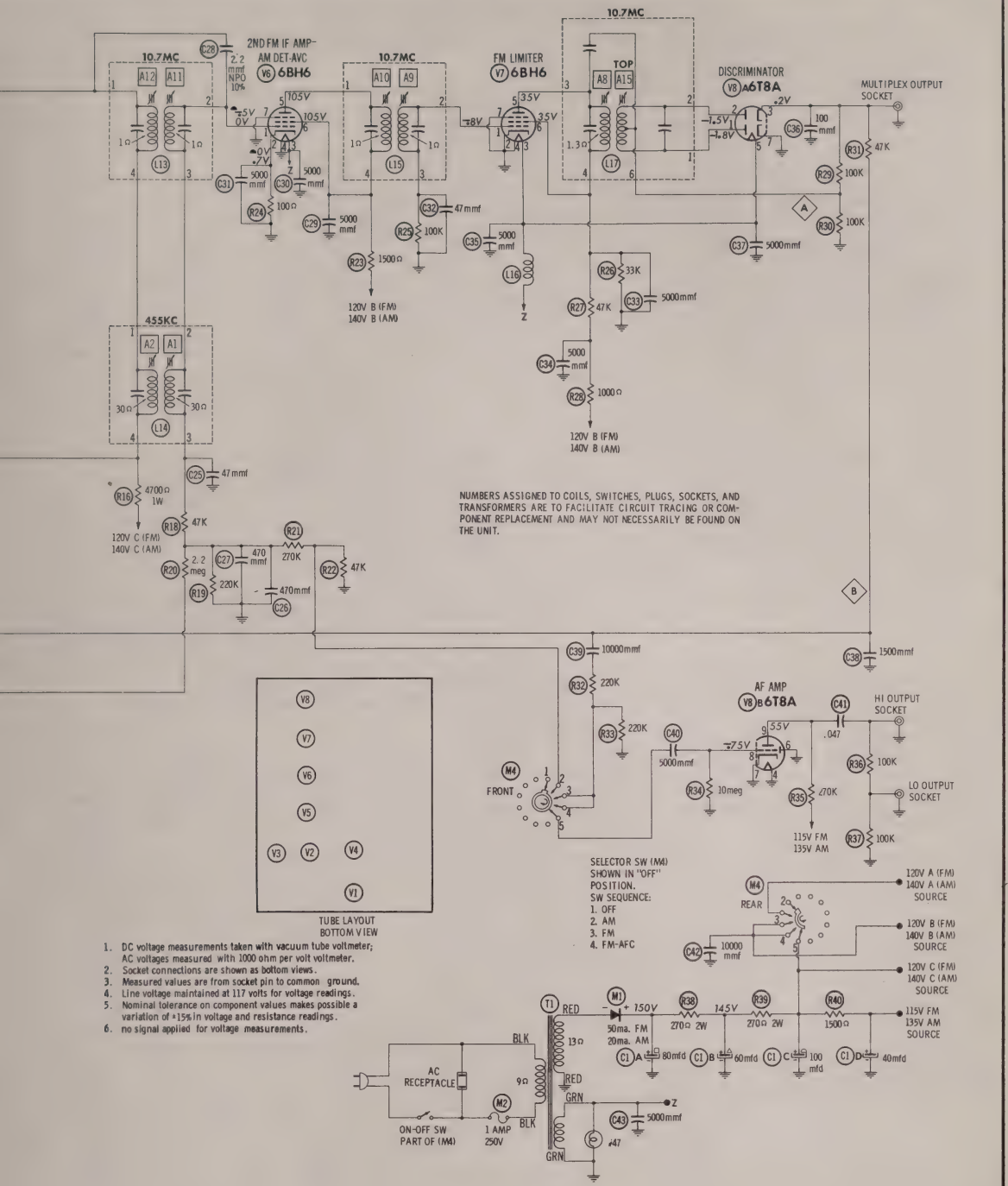


1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. no signal applied for voltage measurements.

HARMONY MODEL TA-20

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.
Use only enough sweep generator output to provide a usable pattern on scope.
Suggested Alignment tools:
A1 thru A4, A7 thru A16.....GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A5, A6, A18.....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A17.....GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

AM ALIGNMENT—SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .01mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ Mod.)	(AM) Tuning gang fully open.	AC probe across Hi Output jack.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	1600KC	1600KC	"	A5	"
3.	Across AM Antenna terminals.	1400KC	Tune to 1400KC signal.	"	A6	Adjust for maximum deflection while rocking tuning gang.
4.	"	600KC	Tune to 600KC signal.	"	A7	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .001mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe thru 1meg to point Ⓐ. Common to chassis.	A8, A9, A10, A11, A12, A13, A14	Adjust for maximum deflection.
6.	"	"	"	DC probe to point Ⓑ. Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .001mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. thru 27K to point Ⓐ. Low side to chassis.	A8, A9, A10, A11, A12, A13, A14	Adjust for maximum gain and symmetry of response similar to Fig. 1.
6.	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A15	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of cross-over lines.

FM IF ALIGNMENT—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	High side thru 270Ω to FM antenna terminal. Low side to chassis.	106MC (Unmod.)	(FM) 106MC	DC probe thru 1meg to point Ⓐ. Common to chassis.	A16, A17	Adjust for maximum deflection.

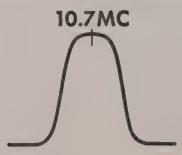


FIG. 1

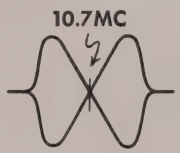


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆	GENERAL ELECTRIC ◆	RAYTHEON ◆	SYLVANIA ◆
ITEM No.	USE	TYPE
V1	FM RF Amplifier	6BJ6
V2	FM Mixer	6BE6
V3	FM Osc.-FM AFC	12AT7
V4	AM Converter	6BE6
V5	1st FM-AM IF Amp.	6BJ6
V6	2nd FM IF Amp.-AM Det.-AVC	6BH6
V7	FM Limiter	6BH6
V8	Discriminator - AF Amp.	6T8A

ELECTROLYTIC CAPACITORS

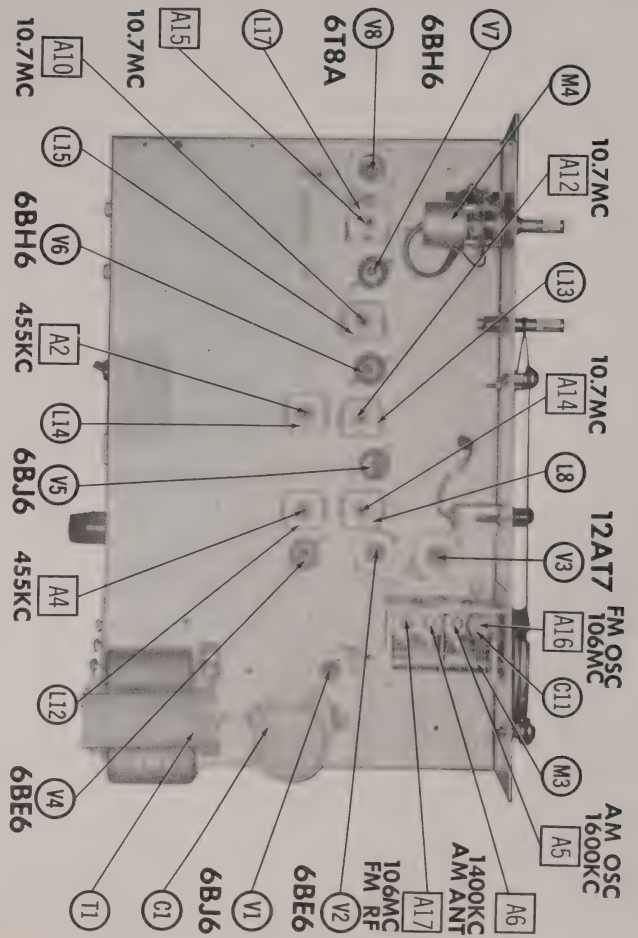
ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA HARMONY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■80	150		AFH4-01-40	D0014	FP412	TMQ-115	TVL-4445	
B	▲60	150							
C	▲100	150							
D	40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C3	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C4	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C5	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C6	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C7	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C8	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C9	5 10%		1469-000005	TCZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C10	100 NPO 10%		NPO-SI 100	TCZ-100	C10T1C	CCTO-101	CNO-310	10TCC-T10
C11	3.5-12							
C12	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C13	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C14	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C15	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C16	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C17	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C18	100 NPO 10%		NPO-SI 100	TCZ-100	C10T1C	CCTO-101	CNO-310	10TCC-T10
C19	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C20	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C22	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C23	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C24	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C25	47		BPD-000047	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C26	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C27	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C28	2.2 NPO 10%		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C29	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C30	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C31	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C32	47		BPD-000047	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C33	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C34	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C35	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C36	100		BPD-0001	DD-101	L10T1	CCD-101	GP310	10TS-T10
C37	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C38	1500		BPD-0015	DD-152	BYA10D15	CCD-152	B-215	5HK-D15
C39	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C40	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C41	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C42	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C43	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C44	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	1500Ω	
R2	100K	
R3	1500Ω	
R4	1500Ω	
R5	220Ω	
R6	22K	
R7	1000Ω	
R8	1000Ω	
R9	470Ω	
R10	2.2meg	
R11	1.5meg	
R12	1meg	
R13	100K	
R14	1500Ω	

ITEM No.	RATING	REMARKS
R15	22K	
R16	4700Ω 1W	
R17	100Ω	
R18	47K	
R19	220K	
R20	2.2meg	
R21	270K	
R22	47K	
R23	1500Ω	
R24	100Ω	
R25	100K	
R26	33K	
R27	47K	
R28	1000Ω	

ITEM No.	RATING	REMARKS
R29	100K	
R30	100K	
R31	47K	
R32	220K	
R33	220K	
R34	10meg	
R35	270K	
R36	100K	
R37	100K	
R38	270Ω 2W	
R39	270Ω 2W	
R40	1500Ω	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		HARMONY PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Ant. Coil							
L2	RF Choke							3.2uh
L3	Fil. Choke		19-1002	19-1002	SW-630	4528		2.9uh
L4	FM RF Coil							
L5	FM Osc. Coil							
L6	RF Choke							3.2uh
L7	Fil. Choke		19-1002	19-1002	SW-630	4528		2.9uh
L8	1st FM IF Trans.		16-3487	16-3487	FM-254	1463		
L9	Fil. Choke		19-1002	19-1002	SW-630	4528		2.9uh
L10	AM Ant. Coil		14-1071	14-1071	BC-386	70-A		
L11	AM Osc. Coil		14-1073	14-1073	BC-393	69-OSC		
L12	1st AM IF Trans.		16-6758	16-6758	BC-352	12-C1	RF-1	
L13	2nd FM IF Trans.		16-3487	16-3487	FM-254	1463		
L14	2nd AM IF Trans.		16-6758	16-6758	BC-353	12-C2	RF-2	
L15	3rd FM IF Trans.		16-3487	16-3487	FM-254	1463		
L16	Fil. Choke		19-1002	19-1002	SW-630	4528		2.9uh
L17	Discriminator		17-3494	17-3494	FM-253	1464-WB		

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	HARMONY PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .29A	110V @ .050A	6.3V @ 2.8A	14K3						

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT (Measured)	HARMONY PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.050A	*	2E4 *	RE504 *	K200 *	SR200 *	* Silicon

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			HARMONY PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	1A 250V			312001 (3AG 1A 250V)	342001	AGC 1	HKP

MISCELLANEOUS

ITEM No.	PART NAME	HARMONY PART No.	NOTES
M3	Tuning Cap.		AM, 2 Gang (Ant. 19-312mmf, Osc. 21-185mmf)
M4	Switch		Function Selector, Includes Power Off-On, (Rotary)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

HARMONY MODELS SA-10B, SA-10W

HARMONY MODELS
SA-10B, SA-10W

MODEL SA-10W

HARMONY MODELS
SA-10B, SA-10W

TRADE NAME	Harmony Models SA-10B, SA-10W
MANUFACTURER	Continental Mfg. Inc., 1612 California Street, Omaha, Nebraska
TYPE SET	AC Operated 6 Tube Stereo Amplifier
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 62 Watts, .64 Amp. @ 117 Volts AC

SET 498 FOLDER 10

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JV881

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PARTS LIST AND DESCRIPTIONS

TUBES

• CBS • GENERAL ELECTRIC •			• RAYTHEON • SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel 1 AF Amp. - Channel 2 AF Amp.	ECC83/12AX7	V3	Channel 1 Output	50C5
V2	Channel 1 Phase Inv. - Channel 2 Phase Inv.	ECC83/12AX7	V4	Channel 1 Output	50C5
			V5	Channel 2 Output	50C5
			V6	Channel 2 Output	50C5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	HARMONY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■40	150		AFH4-01	D0010	FP318,74	TMQ-1	TVL-4441	
B	▲40	150				TC47			
C	20	150							
D	▲30	150							

FIXED CAPACITORS

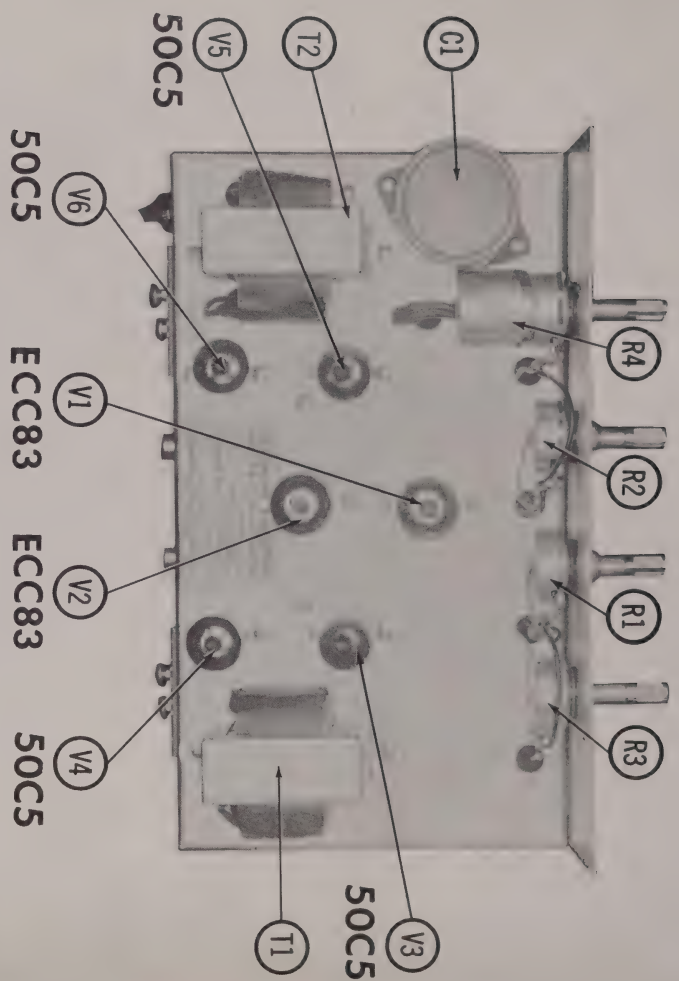
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C3	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C4	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C5	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C6	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C7	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C8	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C9	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C10	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C11	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C12	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C13	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C14	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C15	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C16	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C17	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C18	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	HARMONY PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	500K		1215	B-59	A47-500K-S	Q11-133	U50	Volume, Channel 1
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	500K		1215	B-59	A47-500K-S	Q11-133	U50	Volume, Channel 2
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	500K			B-60	A47-500K-Z	Q13-133	U48	Tone, Channel 1
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	500K			B-60-S	A47-500K-Z	Q13-133	U48	Tone, Channel 2
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-41	Power Off-On

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R5	10meg	
R6	270K	
R7	10meg	
R8	270K	
R9	470K	
R10	100Ω 2W	
R11	470K	

ITEM No.	RATING	REMARKS
R12	100K	
R13	10meg	
R14	270K	
R15	10meg	
R16	270K	
R17	470K	
R18	100Ω 2W	

ITEM No.	RATING	REMARKS
R19	470K	
R20	100K	
R21	22K	
R22	1500Ω 2W	
R23	10Ω 2W	
R24	47Ω 2W	
R25	47Ω 2W	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	HARMONY PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4000Ω CT	6-8Ω	14W2	24S07	A-2901	AU-600	A-3823	24S07	S-53X	
T2	4000Ω CT	6-8Ω	14W2	24S07	A-2901	AU-600	A-3823	24S07	S-53X	

RECTIFIERS

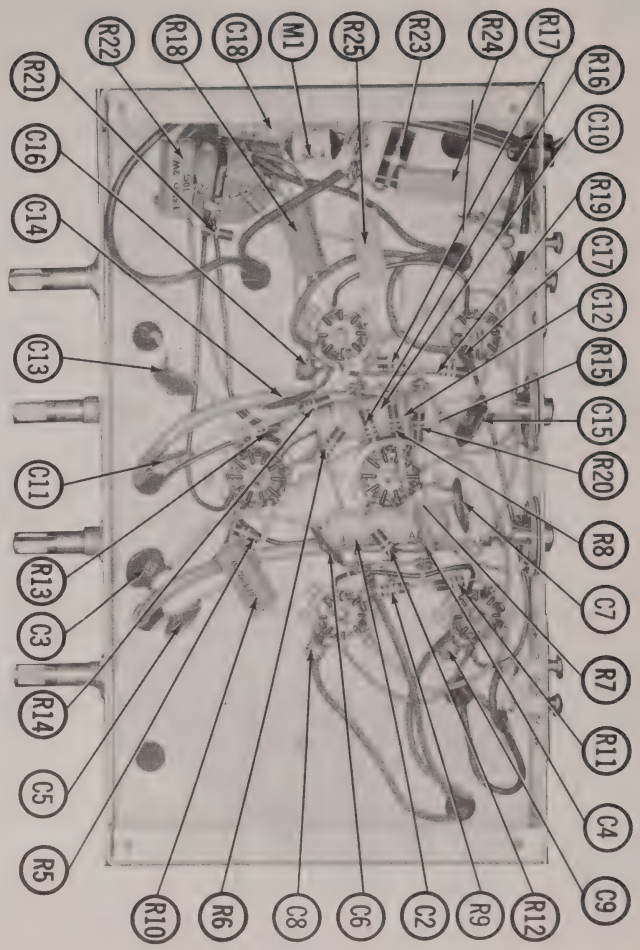
ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT (Measured)	HARMONY PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.150A		2E4 *	RE504 *	K200 *	SR200 *	* Silicon

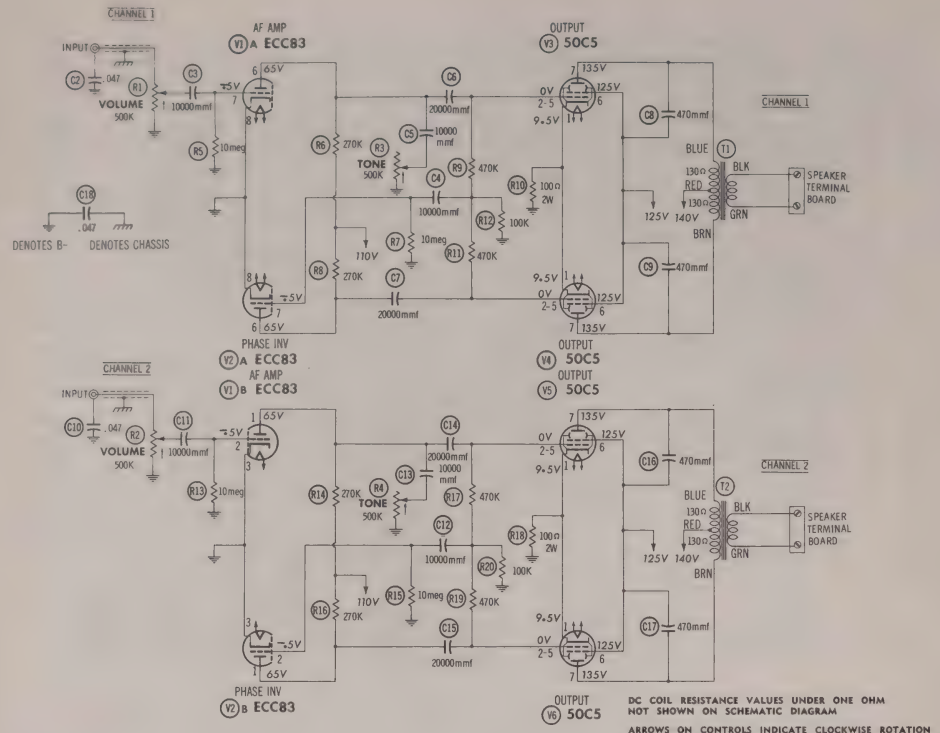
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

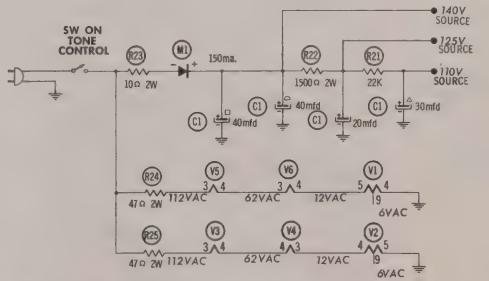
CHASSIS—BOTTOM VIEW





DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†290K	10meg	0Ω	0Ω	12Ω	†290K	10meg	0Ω	6Ω
V2	ECC83 12AX7	†290K	10meg	0Ω	12Ω	0Ω	†290K	10meg	0Ω	6Ω
V3	50C5	100Ω	570K	72Ω	50Ω	570K	†1500Ω	†130Ω		
V4	50C5	100Ω	570K	12Ω	50Ω	570K	†1500Ω	†130Ω		
V5	50C5	100Ω	570K	72Ω	50Ω	570K	†1500Ω	†130Ω		
V6	50C5	100Ω	570K	50Ω	12Ω	570K	†1500Ω	†130Ω		

† MEASURED FROM OUTPUT OF M1.

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HARMONY MODELS SA-10B, SA-10W

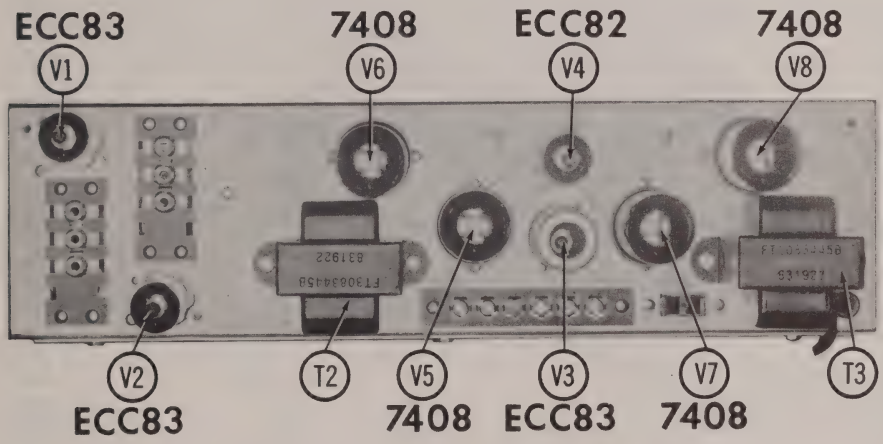
PHOTOFACT® Folder

KNIGHT MODEL
KN-520 (92SX432)

KNIGHT MODEL
KN-520 (92SX432)

KNIGHT MODEL
KN-520 (92SX432)

TRADE NAME	Knight Models KN-520 (92SX432)
SUPPLIER	Allied Radio Corp., 100 N. Western Ave., Chicago 80, Illinois
TYPE SET	AC Operated 8 Tube Stereo Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 74 Watts, .74 Amp. @ 117 Volts AC



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

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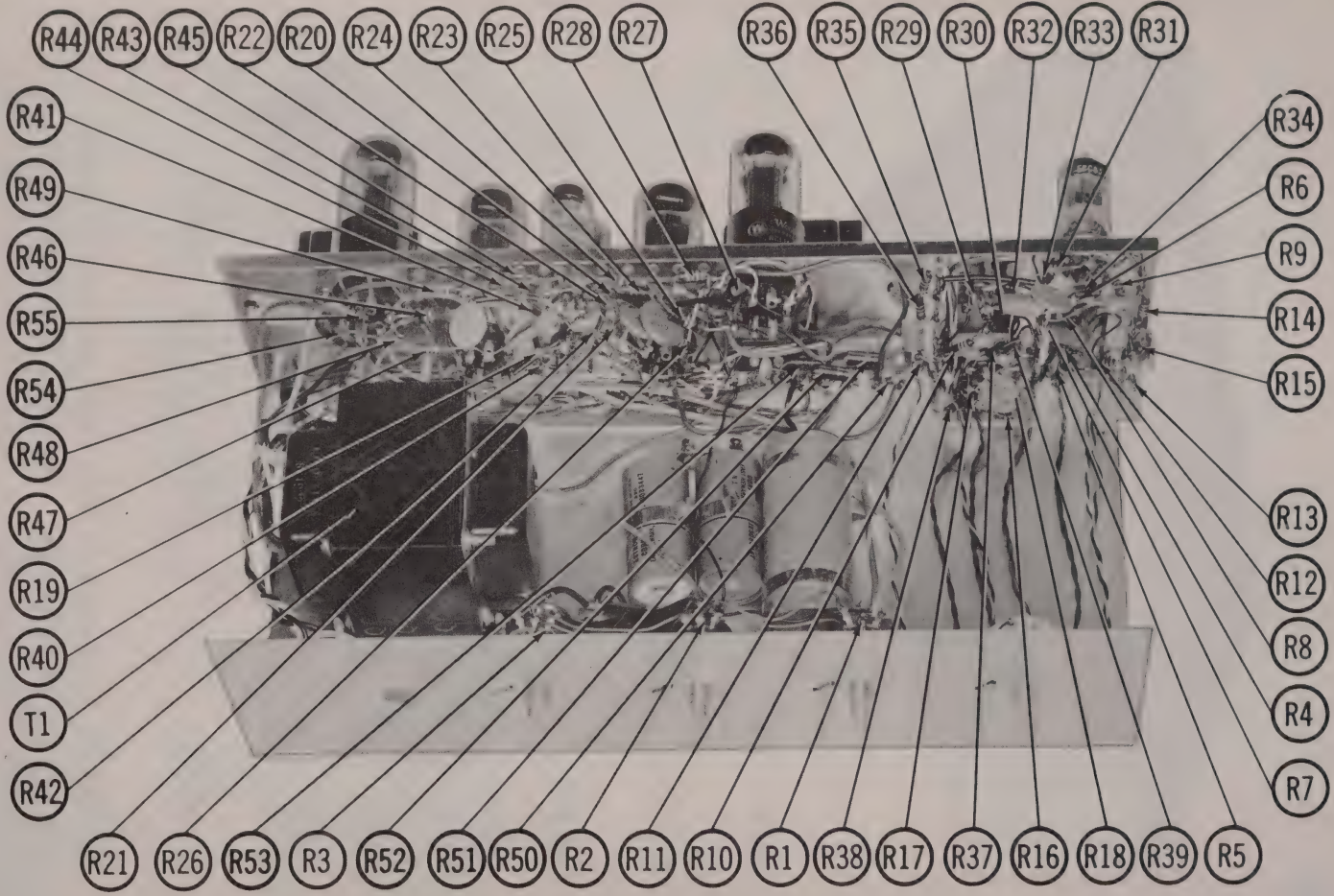
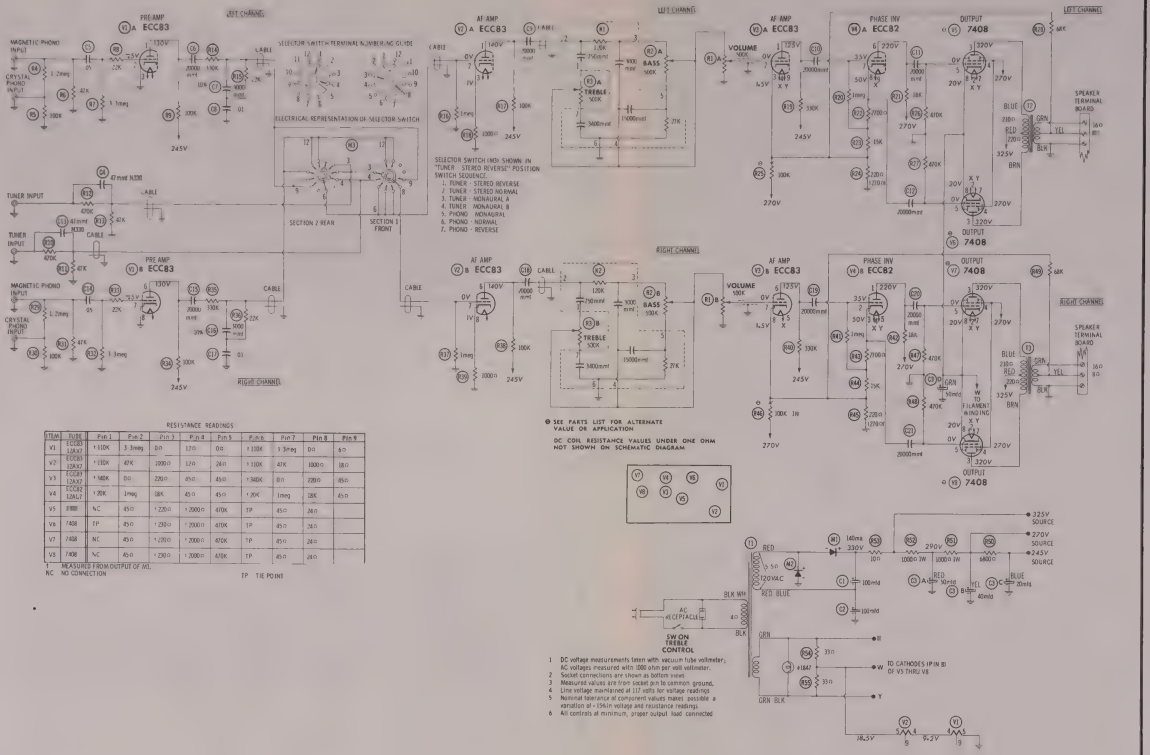
SET498 FOLDER 11



CHASSIS BOTTOM VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83	110K	3.3meg	0Ω	120Ω	0Ω	110K	3.3meg	0Ω	0Ω
V2	ECC83	110K	47K	1000Ω	12Ω	2kΩ	110K	47K	1000Ω	18Ω
V3	ECC81	140K	0Ω	220Ω	0Ω	45Ω	140K	0Ω	220Ω	45Ω
V4	ECC82	70K	1meg	38K	45Ω	45Ω	70K	1meg	38K	45Ω
V5	EBBB	NC	45Ω	1.25kΩ	2000Ω	470K	TP	45Ω	26Ω	
V6	7408	TP	45Ω	1.25kΩ	2000Ω	470K	TP	45Ω	26Ω	
V7	7408	NC	45Ω	1.25kΩ	2000Ω	470K	TP	45Ω	26Ω	
V8	7408	NC	45Ω	1.25kΩ	2000Ω	470K	TP	45Ω	26Ω	

1 MEASURED FROM OUTPUT OF VOL.
NC NO CONNECTION
TP THE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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KNIGHT MODEL KN-520 (92SX432)

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Left Channel Preamp. - Right Channel Preamp.	ECC83/12AX7	V4	Left Channel Phase Inv. - Right Channel Phase Inv.	ECC82/12AU7
V2	Left Channel AF Amp. - Right Channel AF Amp.	ECC83/12AX7	V5	Left Channel Output	7408 (6V6GT) *
V3	Left Channel AF Amp. - Right Channel AF Amp.	ECC83/12AX7	V6	Left Channel Output	7408 (6V6GT) *
			V7	Right Channel Output	7408 (6V6GT) *
			V8	Right Channel Output	7408 (6V6GT) *

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	100	200	JE3083447	PRS1595	BRI0035	TC1265	TD-100-200	TVAS-1445 *	
C2	100	200	JE3083447	PRS1595	BRI0035	TC1265	TD-100-200	TVAS-1445 *	
C3A	50	350	JE3083402D		BBRD-4445			TVAS-2665 *	
B	40	350			BBRD-0652			TVA-2743	
C	20	350							
D	50	50							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	47 N330					*		
C5	.05 200V		P288N-05	DD-503	CUB2S5	4DP-3-503	GEM-415	2TM-S5
C6	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C7	3000 10%		DI-3000		PM6D3	CCD-302	JL-233	10TS-D30
C8	.01 200V		P288N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C9	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C10	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C11	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C12	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C13	47 N330					*		10TCS-Q47
C14	.05 200V		P288N-05	DD-503	CUB2S1	4DP-3-503	GEM-415	2TM-S5
C15	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C16	3000 10%		DI-3000		PM6D3	CCD-302	JL-233	10TS-D30
C17	.01 200V		P288N-01	D6-103	CUB4S1	4DP-1-103	GEM-211	4TM-S1
C18	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C19	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C20	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C21	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA KNIGHT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K		RV3083430	F1-40		† QJ-1269R	■ UE4131	Volume, Left Channel
B	500K			R2-40				Volume, Right Channel
R2A	500K		RV3083431	F1-41		‡ QJ-1270R	▲ UE4030	Bass, Left Channel
B	500K			R2-41				Bass, Right Channel
R3A	500K		RV3083432	F1-41		†† QJ-1271R	▲ UE4127S	Treble, Left Channel
B	500K			R2-41				Treble, Right Channel
C	Switch			KR-1				Power Off-On

† "Concentrikit" equivalent: K-6 kit with base elements & shafts: B11-133, P14-019 (Panel)
(Not available as a factory assembled unit). B11-133, R1-028 (Rear)

‡ "Concentrikit" equivalent: K-6 kit with base elements and shafts: B13-133, P14-019 (Panel)
(Not available as a factory assembled unit). B13-133, R1-028 (Rear)

†† "Concentrikit" equivalent: K-6 Kit with base elements and shafts: B13-133, P14-019 (Panel)
(Not available as a factory assembled unit). B13-133, R1-028 (Rear)
76-1 (Switch)

■ "STA-LOC" equivalent: FA55L, RU55L, OS562A, IS875.

▲ "STA-LOC" equivalent: FA55A, RU55A, OS562A, IS875.

▲ "STA-LOC" equivalent: FA55A, RU55A, OS562A, IS875, US41.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	1.2meg	
R5	100K	
R6	47K	
R7	3.3meg	
R8	22K	
R9	100K	
R10	470K	
R11	47K	
R12	470K	
R13	47K	
R14	330K	
R15	22K	
R16	1meg	
R17	100K	
R18	1000Ω	
R19	330K	
R20	1meg	
R21	18K	

ITEM No.	RATING	REMARKS
R22	2700Ω	
R23	15K	
R24	220Ω	(270Ω) *
R25	100K 1W	Note 1
R26	470K	
R27	470K	
R28	68K	
R29	1.2meg	
R30	100K	
R31	47K	
R32	3.3meg	
R33	22K	
R34	100K	
R35	330K	
R36	22K	
R37	1meg	
R38	100K	
R39	1000Ω	

ITEM No.	RATING	REMARKS
R40	330K	
R41	1meg	
R42	18K	
R43	2700Ω	
R44	15K	
R45	220Ω	(270Ω)*
R46	100K 1W	Note 1
R47	470K	
R48	470K	
R49	68K	
R50	6800Ω	
R51	1000Ω 1W	
R52	1000Ω 1W	
R53	10Ω	
R54	33Ω	
R55	33Ω	

Note 1. Not used in some versions.

*Alternate Value

PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	KNIGHT PART No.	REPLACEMENT DATA
K1	Tone Comp.	750mmf, 3000mmf, 3400mmf, 15000mmf, 27K, 120K	PC2492902	Sprague TC-22
K2	Tone Comp.	750mmf, 3000mmf, 3400mmf, 15000mmf, 27K, 120K	PC2492902	Sprague TC-22

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6300Ω CT	16Ω Tap @ 8Ω	FT3083445B							
T3	6300Ω CT	16Ω Tap @ 8Ω	FT3083445B							

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .74A	120V @ .550A	6.3V @ 2.5A	FT3083446A						

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	KNIGHT PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.140A	Z3083444	2E4	RE504	K200	SR200	
M2	.140A	Z3083444	2E4	RE504	K200	SR200	

MISCELLANEOUS

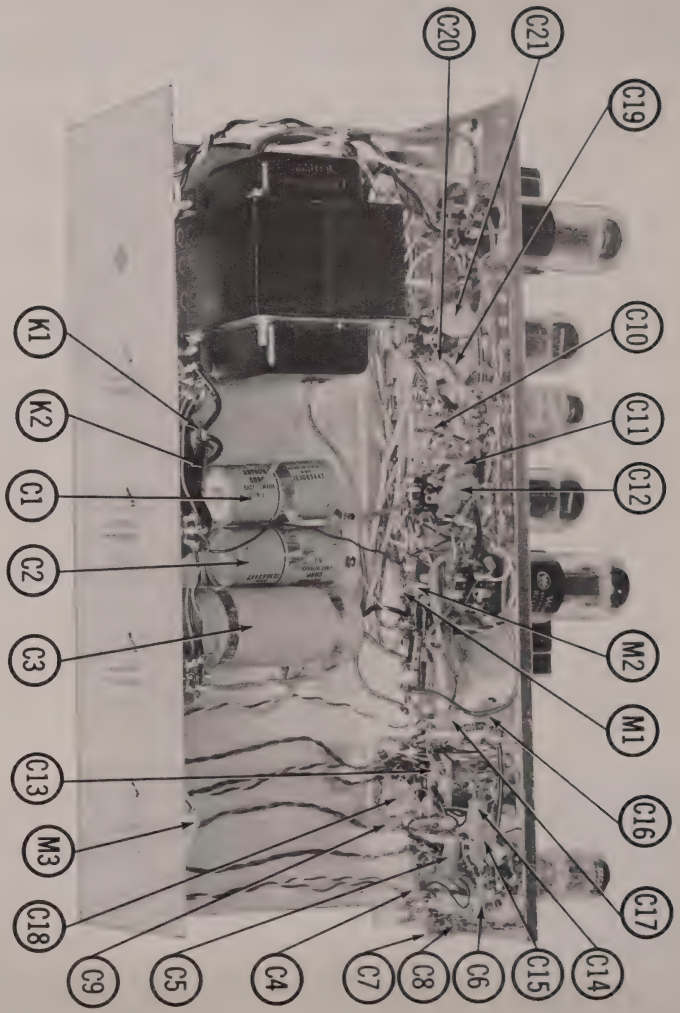
ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M3	Switch	ER3083433	Function Selector (Rotary)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW



PHOTOFACT® Folder with CIRCUITRACE®

LINMARK MODEL T-40

LINMARK
MODEL T-40

LINMARK
MODEL T-40

TRADE NAME	Linmark Model T-40
IMPORTER	Shriro, Inc. 276 Fourth Ave., New York 10, N. Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC RATING 11MA @ 9 Volts DC
TUNING RANGE	BROADCAST 540 - 1650KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3 ..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A4, A6 ..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528
A5 ..... GENERAL CEMENT #8282, 8606, 8606-L, 9091
WALSCO #2526, 2541, 2542, 2543, 2544

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1600KC	1600KC	"	A4	"
3.	"	600KC	600KC	"	A5	"
4.	"	1400KC	Tune to 1400KC signal	"	A6	Adjust for maximum output while rocking tuning gang.

DISASSEMBLY

1. Remove 2 screws holding front escutcheon. Remove escutcheon.
2. Remove screw holding tuning knob. Remove knob.
3. Pry off rear cover.
4. Remove 3 screws holding printed board. Remove board.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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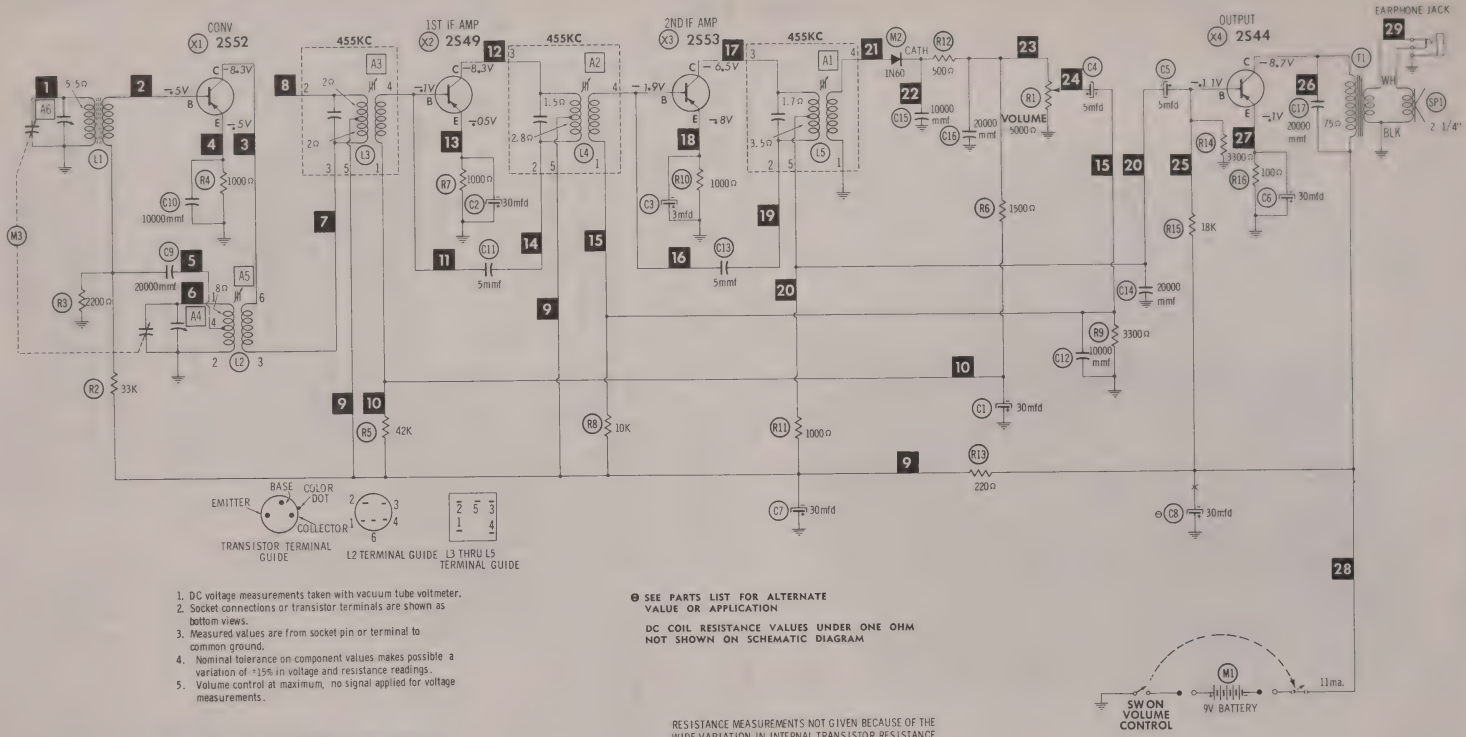
SET 498 FOLDER 12



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

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with CIRCUITRACE®

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LINMARK MODEL T-40

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2852	Converter		2N412	2N486	2N411	PNP
X2	2849	1st IF Amplifier			2N483		PNP
X3	2853	2nd IF Amplifier		2N410	2N483	2N410	PNP
X4	2844	Output		2N406	2N631	2N406	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	LINMARK PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	3		PTT3030	NLW30-6	PET130	ML30-6	TE-1092	
C2	30	3		PTT3030	NLW30-6	PET130	ML30-6	TE-1092	
C3	3	3		XPP-3003	NLW3-6	TT6X3	ML4-6	TE-1052	
C4	5	3		XPP-3005	NLW5-6	TT6X5	ML5-6	TE-1052.2	
C5	5	3		XPP-3005	NLW5-6	TT6X5	ML5-6	TE-1052.2	
C6	30	3		PTT3030	NLW30-6	PET130	ML30-6	TE-1092	
C7	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C8	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	Note 1

Note 1. Not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C9	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C10	10000		C80V103AM	DDM-103	H-05S10		TA-110	TG-S10
C11	5		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C12	10000		C80V103AM	DDM-103	H-05S10		TA-110	TG-S10
C13	5		NPO-DI 5.0	DTZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C14	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C15	10000		C80V103AM	DDM-103	H-05S1		TA-110	TG-S10
C16	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C17	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	LINMARK PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4		B16-214				Volume and Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

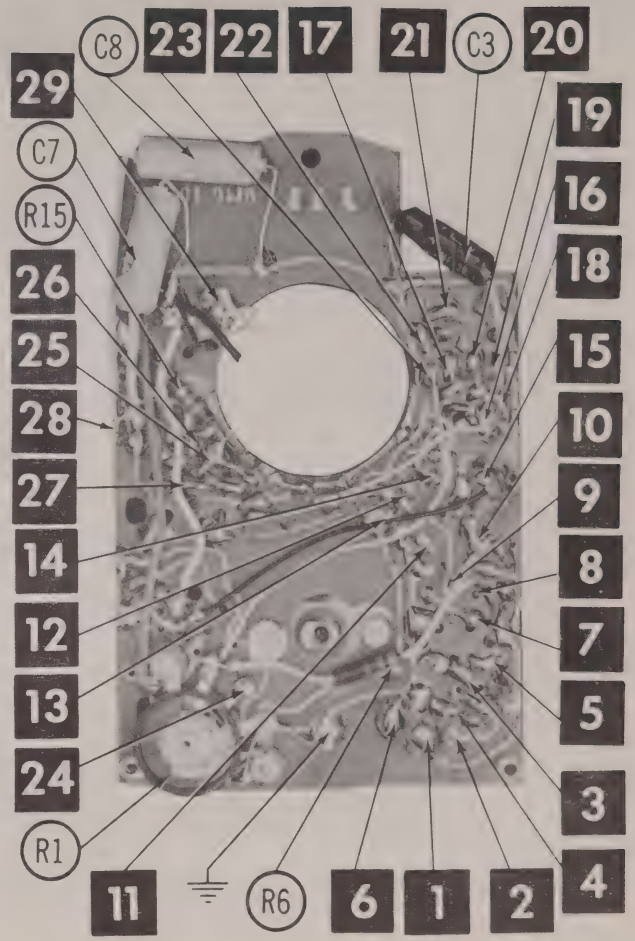
ITEM No.	RATING	REMARKS
R2	33K	
R3	2200Ω	
R4	1000Ω	
R5	42K	
R6	1500Ω	

ITEM No.	RATING	REMARKS
R7	1000Ω	
R8	10K	
R9	3300Ω	
R10	1000Ω	
R11	1000Ω	

ITEM No.	RATING	REMARKS
R12	500Ω	
R13	220Ω	
R14	3300Ω	
R15	18K	
R16	100Ω	

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		LINMARK PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick							
L2	Osc. Coil							
L3	1st IF Trans.							
L4	2nd IF Trans.							
L5	3rd IF Trans.							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	LINMARK PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	800Ω	6-8Ω					TA-26 ①			① Use 12Ω Tap

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	LINMARK PART No.	QUAM PART No.	
SP1	2 1/4"	PM	6-8Ω			

BATTERIES

ITEM No.	VOLTAGE	LINMARK PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2U6		216		M-1604	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		LINMARK PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N60		1N60	1N60	1N60	Detector (Pigtail)

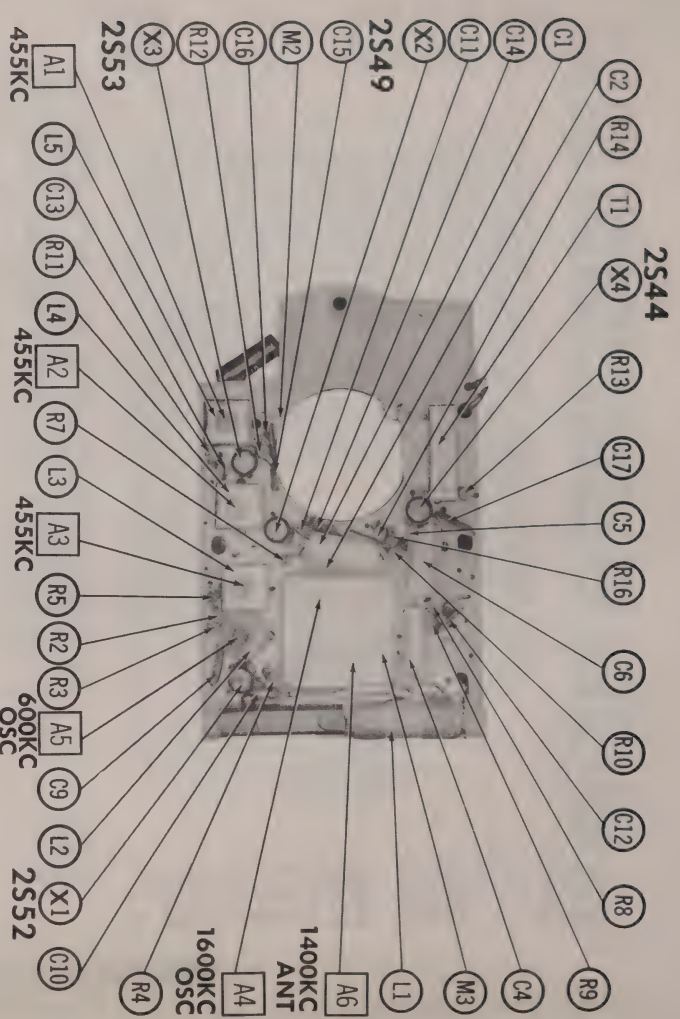
MISCELLANEOUS

ITEM No.	PART NAME	LINMARK PART No.	NOTES
M3	Tuning Cap. Printed Board	8M6105	2 Gang

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder with CIRCUITRACE®

NEC MODEL NT-620

NEC MODEL NT-620

NEC MODEL NT-620

TRADE NAME	NEC Model NT-620
IMPORTER	Kanematsu New York, Inc., Import & Export, 150 Broadway, New York 39, N. Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC — RATING 7MA@9 Volts DC (No Signal, Min. Volume)
TUNING RANGE—BROADCAST	520 - 1700KC — 11MA@9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A4, A6...GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1600KC	1600KC	"	A4	"
3.	"	600KC	600KC	"	A5	"
4.	"	1400KC	Tune to 1400KC signal.	"	A6	Adjust for maximum output while rocking tuning gang.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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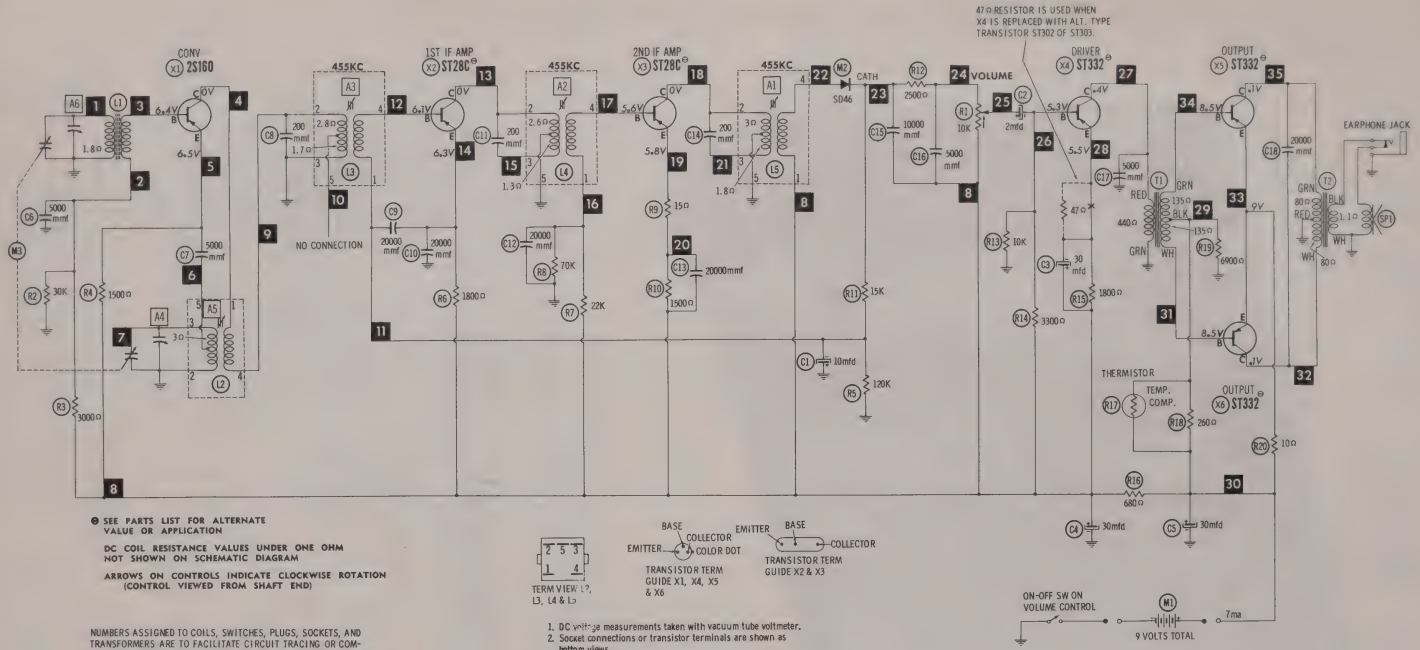
JF930

SET 498 FOLDER 13



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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NEC MODEL NT-620

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S160	Converter			2N486		PNP
X2	ST28C *	1st IF Amplifier			2N483		PNP
X3	ST28C *	2nd IF Amplifier			2N483		PNP
X4	ST332 †	Driver		2N406	2N362		PNP
X5	ST332 ‡	Output		2N408	2N633		PNP } Matched
X6	ST332 ‡	Output		2N408	2N633		PNP } Pair

* Alternate Type ST28B
† Alternate Type ST302 or ST303
‡ Alternate Type ST303

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	NEC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	10	3	TRG-111H	PTT3010	NLW10-6	TT3X10	ML10-6	TE-1053	
C2	2	12	TRG-111E	XPP-12002	NLW2-50	TT12X2	ML2-15	TE-1121	
C3	30	6	TRG-111G2	PWE6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C4	30	6	TRG-111G2	PWE6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C5	30	6	TRG-111G2	PWE6030	NLW30-6	TT6X30	ML30-6	TE-1092	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TA-250	TG-D50
C7	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TA-250	TG-D50
C8	200		SI 200	D6-201	L10T2	CCD-201	GP320	10TS-T20
C9	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C10	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C11	200		SI 200	D6-201	L10T2	CCD-201	GP320	10TS-T20
C12	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C13	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20
C14	200		SI 200	D6-201	L10T2	CCD-201	GP320	10TS-T20
C15	10000		C80V103AM	DDM-103	H-05S1		TG-110	TG-S10
C16	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TG-250	TG-D50
C17	5000		C80V502AM	DDM-502	H-05D5	CCD-502	TG-250	TG-D50
C18	20000		C80V203AM	DDM-203	H-05S2		TG-120	TG-S20

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	NEC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	10K	1/4	TRG-274	B16-216				Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	30K	
R3	3000Ω	
R4	1500Ω	
R5	120K	
R6	1800Ω	
R7	22K	
R8	70K	

ITEM No.	RATING	REMARKS
R9	15Ω	
R10	1500Ω	
R11	15K	
R12	2500Ω	
R13	10K	
R14	3300Ω	
R15	1800Ω	

ITEM No.	RATING	REMARKS
R16	680Ω	
R17	Temp. Comp.	#TRG-293
R18	260Ω	
R19	6900Ω	
R20	10Ω	

Number.

PRINTED BOARD

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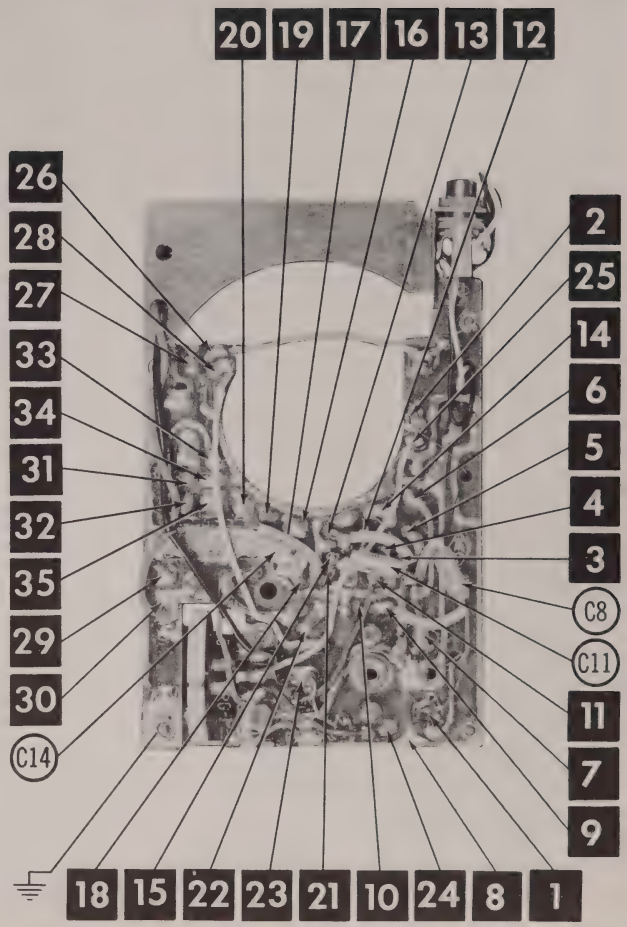


PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		NEC PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	TRG-268						
L2	Osc. Coil	TRG-269						
L3	1st IF Trans.	TRG-270A						
L4	2nd IF Trans.	TRG-270B						
L5	3rd IF Trans.	TRG-270C						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	NEC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1	1	TRG-271						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	NEC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	400Ω CT	6-8Ω	TRG-272							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	NEC PART No.	QUAM PART No.	
SP1	2 1/4"	PM	6-8Ω	TRG-273		

BATTERIES

ITEM No.	VOLTAGE	NEC PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	BL-006P		2U6		216		M-1604	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		NEC PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	SD-46		1N60	1N60	1N60	Detector (Pigtail)

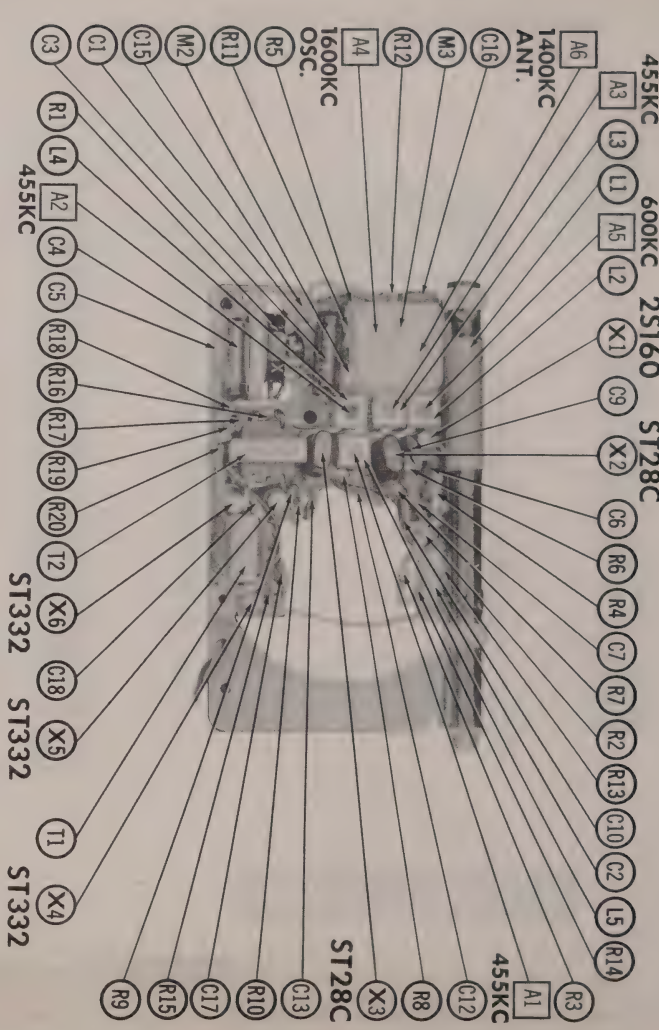
MISCELLANEOUS

ITEM No.	PART NAME	NEC PART No.	NOTES
M3	Tuning Cap.	TRG-278	2 Gang

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



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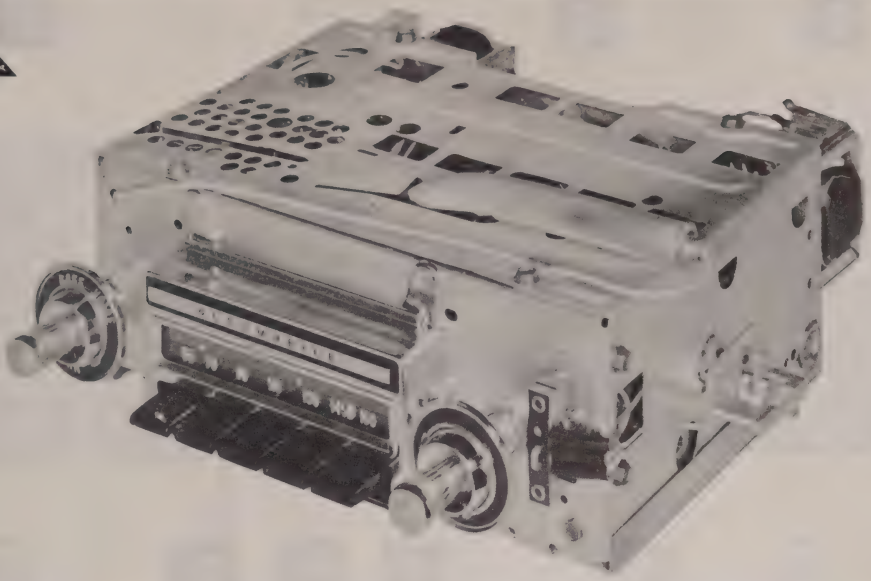
MODEL 989276



TRADE NAME	Oldsmobile Model 989276 (For 1960 Oldsmobile Automobiles)
MANUFACTURER	Delco Radio Div., G. M. Corp., Kokomo, Indiana
TYPE SET	Battery Operated 4 Tube, 1 Transistor Custom Built Automobile AM Receiver
POWER SUPPLY	12 Volt Storage Battery
TUNING RANGE—BROADCAST	540 - 1600KC RATING 2.3 Amp. @12.6 Volts DC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1 thru A4...GENERAL CEMENT #9440
A5, A9, A10...GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A6, A7, A8..GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	262KC (400% Mod.)	High Freq. End Stop	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
	Check setting of Oscillator core (A5). Rear of core should be 1 5/8" from mounting end of coil form.					
2.	"	1615KC	"	"	A6, A7, A8	"
3.	"	600KC	600KC Signal.	"	A9, A10	"
4.	"	1615KC	1615KC Signal.	"	A7, A8	"
5.	"	1100KC	1100KC Signal.	"		Adjust pointer adjustment until pointer coincides with 1100 on dial.
6.	With radio installed in car and antenna fully extended, tune in a weak station near 900KC and adjust A8 for maximum output.					

PUSHBUTTON ADJUSTMENT

1. Pull pushbutton out.
2. Tune manually to desired station.
3. Press button in firmly.
4. Repeat for remaining pushbuttons.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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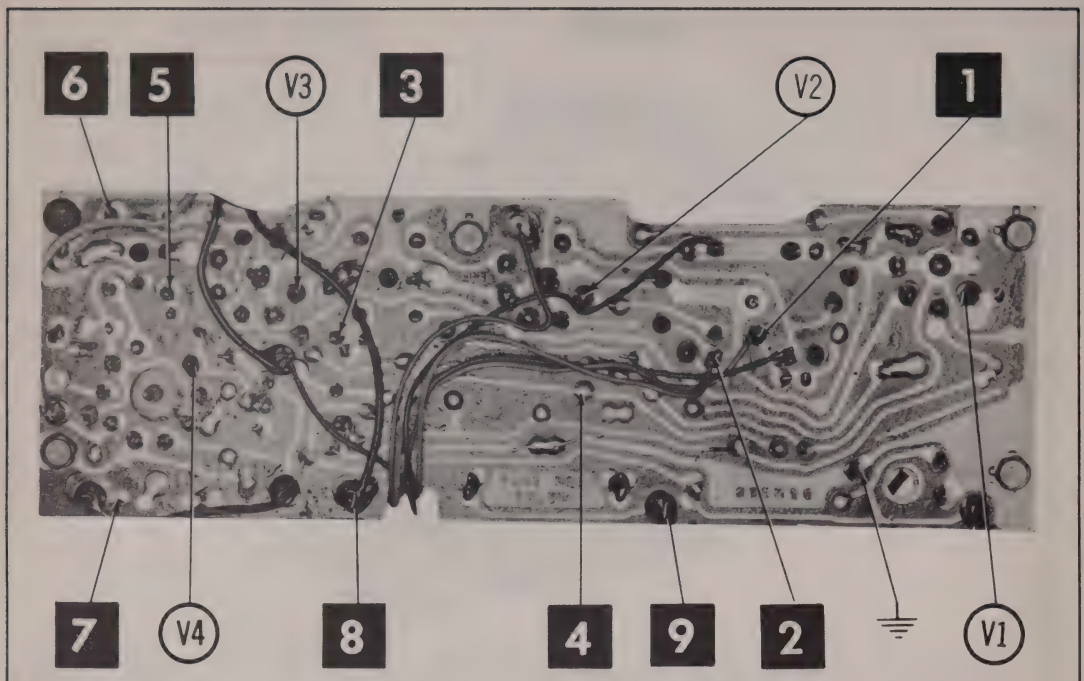
OLDSMOBILE
MODEL 989276
OLDSMOBILE
MODEL 989276
SET498 FOLDER 14



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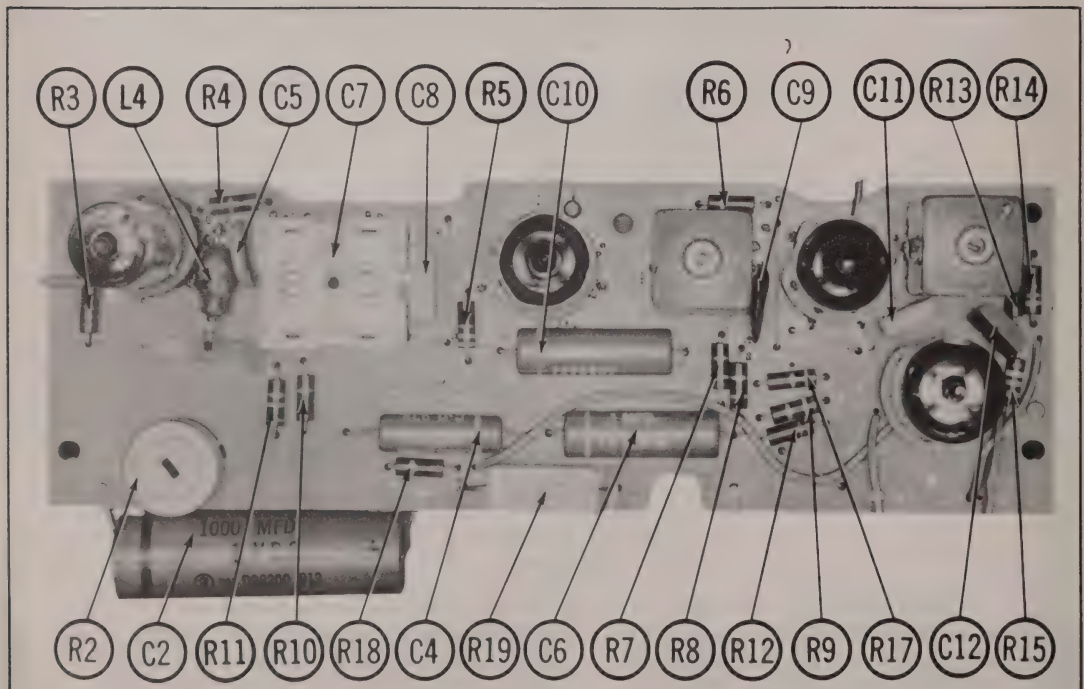
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



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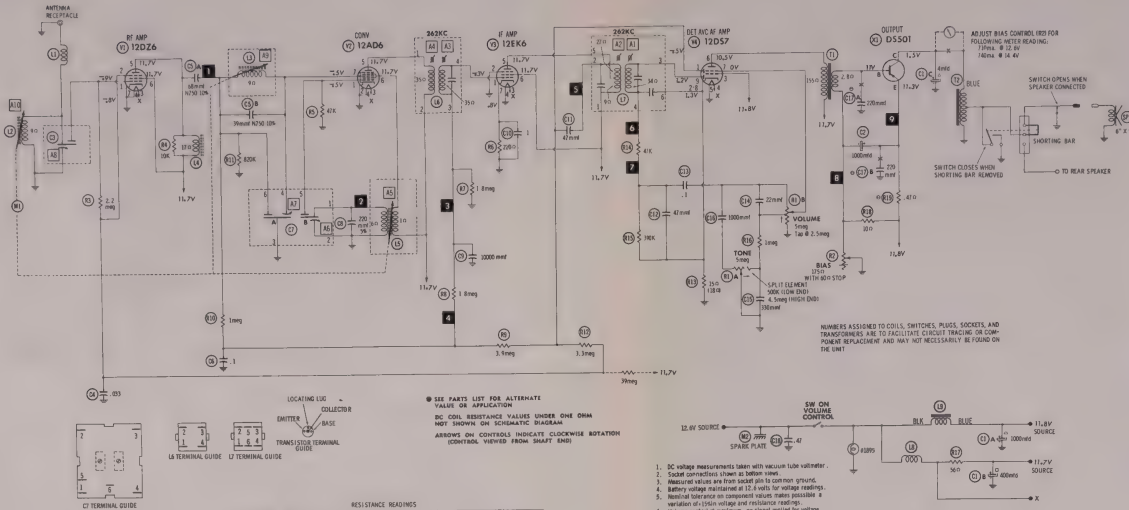
ANTENNA RECEPTACLE
RF AMP V1 12DZ6
CONV V2 12AD6
262KC
IF AMP V3 12EK6
262KC
DET AVC AF AMP V4 12DS7
OUTPUT X1 DS501
ADJUST BIAS CONTROL IRIS FOR FOLLOWING METER READING: 75mA @ 12.6V 140mA @ 14.4V
SWITCH OPENS WHEN SPEAKER CONNECTED
SHORTING BAR
SWITCH CLOSES WHEN SHORTING BAR REMOVED
TO REAR SPEAKER
VOLUME 5meg Tap @ 2.5meg
TONE 5meg
BIAS 175Ω WITH ADJ STOP
SPLIT ELEMENT 500K (LOW END) 4.5meg (HIGH END) 350mmf
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT
11.7V
99meg
3.9meg
3.3meg
1meg
1.8meg
.033

LOCATING LUG
COLLECTOR
EMITTER
BASE
TRANSISTOR TERMINAL GUIDE

L6 TERMINAL GUIDE L7 TERMINAL GUIDE

C7 TERMINAL GUIDE

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12DZ6	10.5meg	8.2meg	.1Ω	0Ω	730Ω	560Ω	0Ω		
V2	12AD6	47K	0Ω	.1Ω	0Ω	91Ω	51Ω	825K		
V3	12EK6	2meg	0Ω	.1Ω	0Ω	65Ω	56Ω	220Ω		
V4	12DS7	6.9meg	15Ω	.8Ω	.1Ω	0Ω	230Ω	0Ω	15Ω	470K

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN FOR X1 BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

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OLDSMOBILE
MODEL 98927A

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	RF Amplifier	12DZ6
V2	Converter	12AD6
V3	IF Amplifier	12EK6
V4	Det. -AVC-AF Amp.	12DS7

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	DS501	Output	2N235A			2N677 *	PNP

* Mounting Change. Drill New Mounting Holes.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲1000	16	7275315	AFH3-54-40		WP300, 89		TVLS-3021, 5*	
B	■400	16							
C	▲4	11, 5							
C2	1000	1	7271557	PRS6V1000	BBR1000-6	TC110	TD-1000-6	TVA-1104	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3		#7275275						
C4	.033 75V		P288N-033	DD-303	PM4S33	1DP-2-333	GEM-4133	6TM-S33
C5A	68 N750 10%		N750-DI 68	DTN-68	C10Q68U	CCTN-680	CN7-468	10TCU-Q68
B	39 N750 10%			TCN-39	C10Q39U	CCTN-390	CN7-439	10TCU-Q39
C6	.1 75V		P288N-1	DF-104	CUB2P1	1DP-2-104	GEM-201	2TM-P1
C7A		#7273693						
B								
C8	220 5%		1469-00022	TCZ-220	22R5T22	CM-19B-221J	CNO-322	MS-322
C9	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C10	.1 75V		P288N-1	DF-104	CUB2P1	1DP-2-104	GEM-201	2TM-P1

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C11	47		1468-000047	DD-470	5W5Q47	CM-19B-470M	CNO-447	1FM-447
C12	47		1468-000047	DD-470	5W5Q47	CM-19B-470M	CNO-447	1FM-447
C13	.1 100V		P288N-1	DF-104	CUB2P1	1DP-2-104	GEM-201	2TM-P1
C14	22		DI-22	DD-220	L10Q22	CCD-220	GP422	10TS-Q22
C15	330		BPD-00033	DD-331	L10T33	CCD-331	GP333	10TS-T33
C16	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C17A	220	Note 1	DI-220	DD-221	L10T22	CCD-221	B-322	10TS-T22
B	220	Note 1	DI-220	DD-221	L10T22	CCD-221	B-322	10TS-T22
C18	.47 100V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47

Note 1. Not used in some versions.
\# Delco Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	5meg*	1/2	7275269					Tone
B	5meg							Volume
	2.5meg tap					† QJ-1345A		
C	Switch							Power Off-On
R2	175Ω		1221422					Bias
	60Ω Stop							

* Element split at center of rotation: 500K low end, 4.5meg high end.
† "Concentrikit" equivalent: K-8 kit with base elements and shafts: B12-341, P14-102 (Panel)
B18-141X, R1-118 (Rear)
S38 (Bushing)
76-1 (Switch)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	2.2meg	
R4	10K	
R5	47K	
R6	220Ω	
R7	1.8meg	
R8	1.8meg	

ITEM No.	RATING	REMARKS
R9	3.9meg	
R10	1meg	
R11	820K	
R12	3.3meg	
R13	15Ω	(18Ω) *
R14	47K	

ITEM No.	RATING	REMARKS
R15	390K	
R16	1meg	
R17	56Ω	
R18	10Ω	
R19	.47Ω	Note 1

* Alternate Value.
Note 1. Part #7270608, Fuse Type. Some versions may use .33Ω.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		DELCO PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	RF Choke	7255738	19-1004	19-1004	BC-565	4610		6.5uh
L2	Ant. Coil	1221138						
L3	RF Coil	1221138						
L4	RF Choke	7269684						1.8MH
L5	Osc. Coil	122151						
L6	Input IF Trans.	1221257	16-6756	16-6756	BC-344	13-PH1		
L7	Output IF Trans.	1221253						
L8	Fil. Choke	1217846						1.4uh

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L9	.740A	.7Ω	.011 HY	7274342				TC-2		

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4.4	1	1221425			TA-48			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE	REPLACEMENT DATA							NOTES
	PRI.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	10Ω Tap @ 3-4Ω	1221428				TA-50			

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	
SP1	6"x 9"	PM	3-4Ω	7272810	69A3	

MISCELLANEOUS

ITEM No.	PART NAME	DELCO PART No.	NOTES
M1	Tuner		Pushbutton Type Series P2
M2	Spark Plate	7271564	

CABINETS & CABINET PARTS

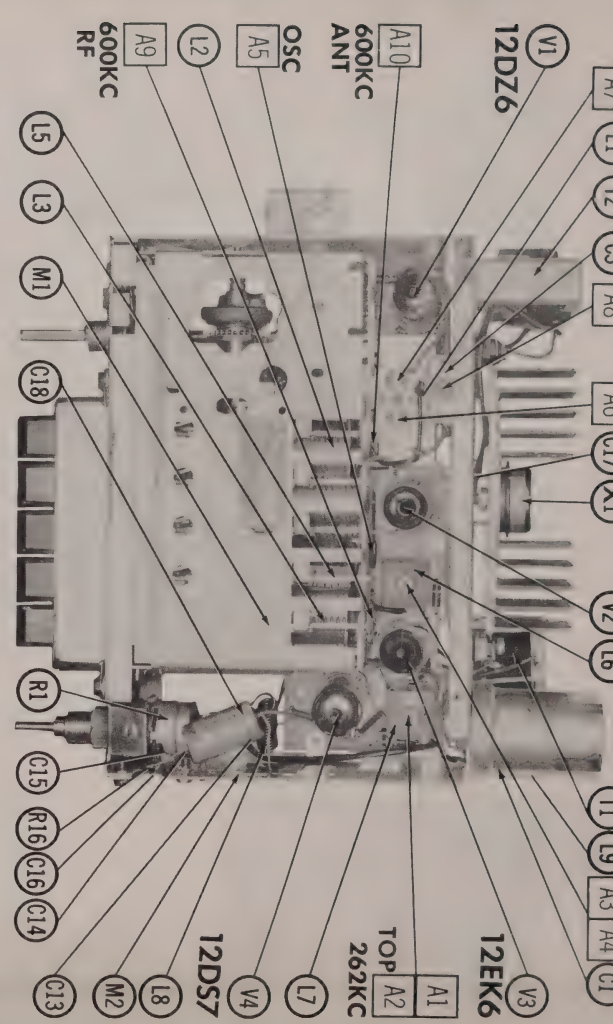
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	578256	Tuning, Volume
Knob	575476	Tone
Knob	575477	Dummy
Pointer Ass'y.	1221067	
Pushbutton Ass'y.	1221424	Includes Front Bearing Plates & Slides
Pushbutton Ass'y.	7275156	Individual

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661

CHASSIS—TOP VIEW



PHOTOFACT® Folder

ROLAND MODELS 5C8, 5C18, 5T10, 5T15, 5T18

ROLAND MODELS 5C8, 5C18, 5T10, 5T15, 5T18

MODEL 5C18

ROLAND MODELS 5C8, 5C18, 5T10, 5T15, 5T18

TRADE NAME	Roland Models 5C8, 5C18, 5T10, 5T15, 5T18
MANUFACTURER	Roland Radio Corp., A Div. of Herold Radio & Electronics. 718 S. Columbus Ave., Mount Vernon, N. Y.
TYPE SET	AC Operated 5 Tube AM Receiver With Electric Clock (5C Series Only.)
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 24 Watts, .22 Amp. @ 117 Volts AC (Less Clock)
TUNING RANGE—BROADCAST	535 — 1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1 thru A4...GENERAL CEMENT #5097, 8727
WALSCO #2515
A5, A6.....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	455KC (400∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	1600KC	1600KC	"	A5	"
3.	Loop	1400KC	Tune to 1400KC Signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang.

HOWARD W. SAMS & CO., INC. Indianapolis 3, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JG886

SET 498 FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES

• CBS • GENERAL ELECTRIC •			• RAYTHEON • SYLVANIA •		
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Converter	12BE6	V4	Output	50C5
V2	IF Amplifier	12BA6	V5	Rectifier	35W4
V3	Det.-AVC-AF Amp.	12AV6			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ROLAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	70	150	582008	PRS2230	BBRD8415	WD220	TDLD-10	TVA-2460	Note 1
B	30	150							

Note 1. Some versions may use 50-30mfd in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	200 N750	Note 1	N750-SI 200	TCN-200	C10T2U	CCTN-201	CN7-320	10TCU-T20
C3	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C4	10000		BPD-01	DD-103	BYA1031	CCD-103	B-110	5HK-S10
C5	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C6	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ROLAND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	½	361880	B-70	A47-1meg-Z	Q13-137	U53	Volume Note 1
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

Note 1. 5T Series use 1meg Volume with Switch (Part #361881).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	2.2meg	(1meg) *①
R3	22K	
R4	220Ω	

ITEM No.	RATING	REMARKS
R5	1meg	(2.2meg) *
R6	47K	
R7	150Ω 1W	

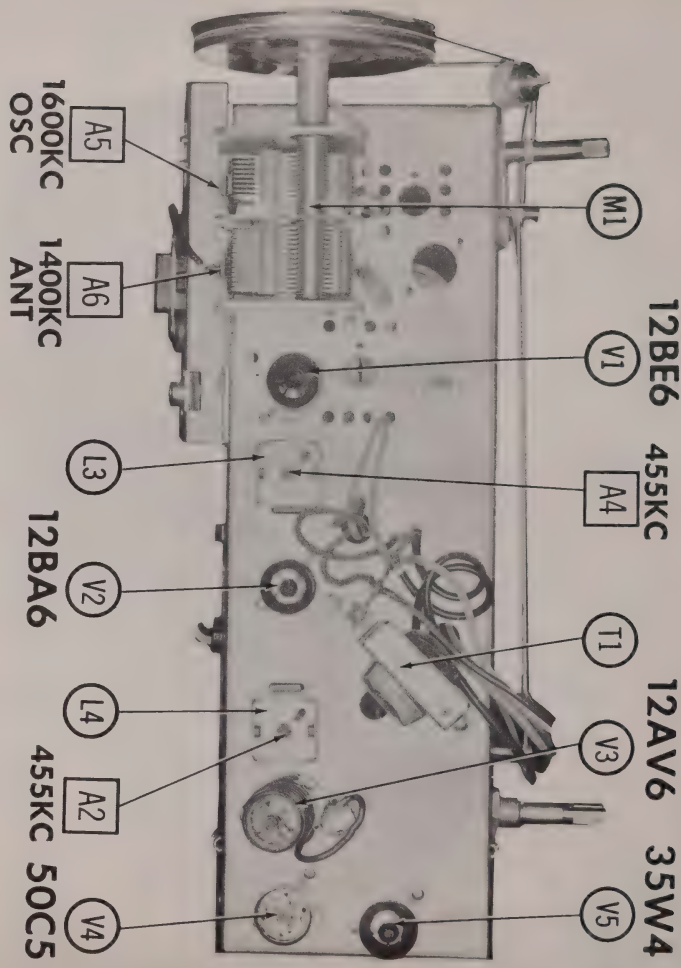
ITEM No.	RATING	REMARKS
R8	2200Ω 1W	

① Not used in some versions.
* Alternate Value.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ROLAND PART No.	REPLACEMENT DATA	
K1	Audio Coupling	220mmf, 250mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	420006	Aerovox	PA-113-2
				Centralab	PC-151
				Cornell-Dubilier	116TM2
				Mallory	MS-107
				Sprague	DT-2

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		ROLAND PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Ant.	460022 ①						
L2	Osc. Coil	455064	14-1073	14-1073	BC-393	69-OSC		
L3	Input IF Trans.	450023	16-6758	16-6758	BC-352	12-C1	RF-1	
L4	Output IF Trans.	450023	16-6758	16-6758	BC-353	12-C2	RF-2	

① Part #460018 used in 5T series. Some 5C series use Part #460021.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2500Ω	1-2Ω	430241	24S64①	A-2902①	AU-604①	A-3849①	24S64①		

① Drill New Mounting Hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ROLAND PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	404003 *	4A07	* Alternate Part #404011.
SP2	4"	PM	3-4Ω	404003 *	4A07	

MISCELLANEOUS

ITEM No.	PART NAME	ROLAND PART No.	NOTES
M1	Tuning Cap.	590046	2 Gang (Ant. 28-507mmf, Osc. 22-187mmf)
M2	Clock Ass'y.	384014	Complete (Wes.)
		384009	Complete (Tel.)
		384011	Complete (Wes.)

CABINETS & CABINET PARTS

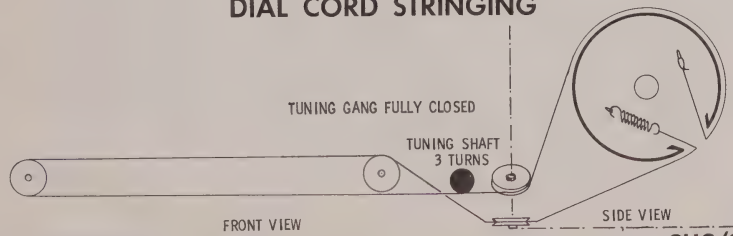
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

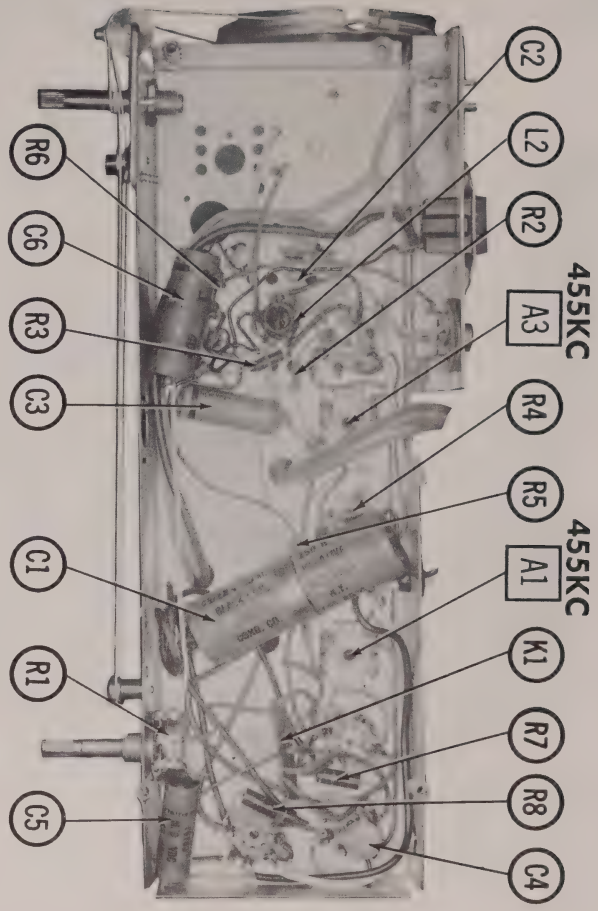
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

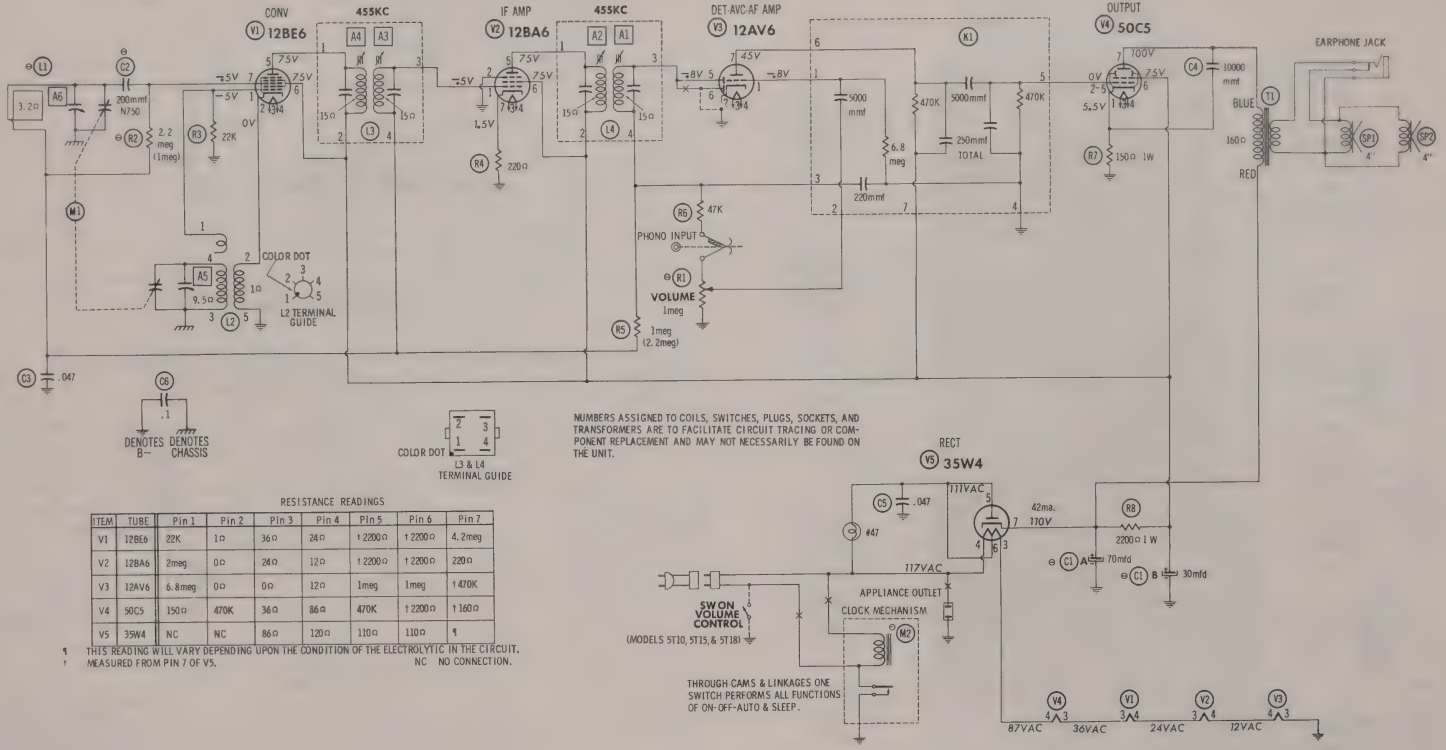
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

DIAL CORD STRINGING



CHASSIS—BOTTOM VIEW





NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1Ω	36Ω	24Ω	†2200Ω	†2200Ω	4.2meg
V2	12BA6	2meg	0Ω	24Ω	12Ω	†2200Ω	†2200Ω	220Ω
V3	12AV6	6.8meg	0Ω	0Ω	12Ω	1meg	1meg	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†2200Ω	†160Ω
V5	35W4	NC	NC	86Ω	120Ω	110Ω	110Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ROLAND MODELS 5C8, 5C18, 5T10, 5T15, 5T18

PHOTOFACT® Folder

ROLAND
MODEL 31-782

ROLAND
MODEL 31-782

ROLAND
MODEL 31-782

TRADE NAME	Roland Model 31-782
MANUFACTURER	Roland Radio Corp., 716 S. Columbus Ave., Mount Vernon, N. Y.
TYPE SET	AC Operated 4 Tube AM Receiver With 3 Speed Manual Record Player
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles
TUNING RANGE—BROADCAST	520 - 1670KC RATING 25 Watts, .24 Amp. @117 Volts AC (Less Motor)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools: A1, A2.....GENERAL CEMENT #5097, 8727
WALSCO #2515
A3, A4.... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .01mfd to pin 1 (grid) of Converter. Low side to chassis.	455KC (400∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2	Adjust for maximum output.
2.	Loop	1600KC	1600KC	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1400KC	Tune to 1400KC signal.	"	A4	Adjust for maximum output while rocking tuning gang.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JO830

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PARTS LIST AND DESCRIPTIONS

TUBES

• CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Converter	12AU6	V3	Output	50C5
V2	Det. -AF Amp.	12AV6	V4	Rectifier	35W4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ROLAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	40	150	583020	PRS3650	BBRT44215	TCT3116	TDLT-4	TVA-3448	
B	40	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	50		SI 50	DD-500	L10Q5	CCD-500	GP450	10TS-Q50
C3	10000		BPD-01	DD-103	BYA1081	CCD-103	B-110	5HK-S10
C4	.05 200V		P288N-05	DD-503	CUB285	4DP-3-503	GEM-415	2TM-S5
C5	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ROLAND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	½	360081	B-70-S	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	Power Off-On

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	2.2meg	
R3	1meg	
R4	470K	

ITEM No.	RATING	REMARKS
R5	22K	
R6	100Ω	
R7	150Ω	

ITEM No.	RATING	REMARKS
R8	2200Ω	
R9	47Ω 1W	

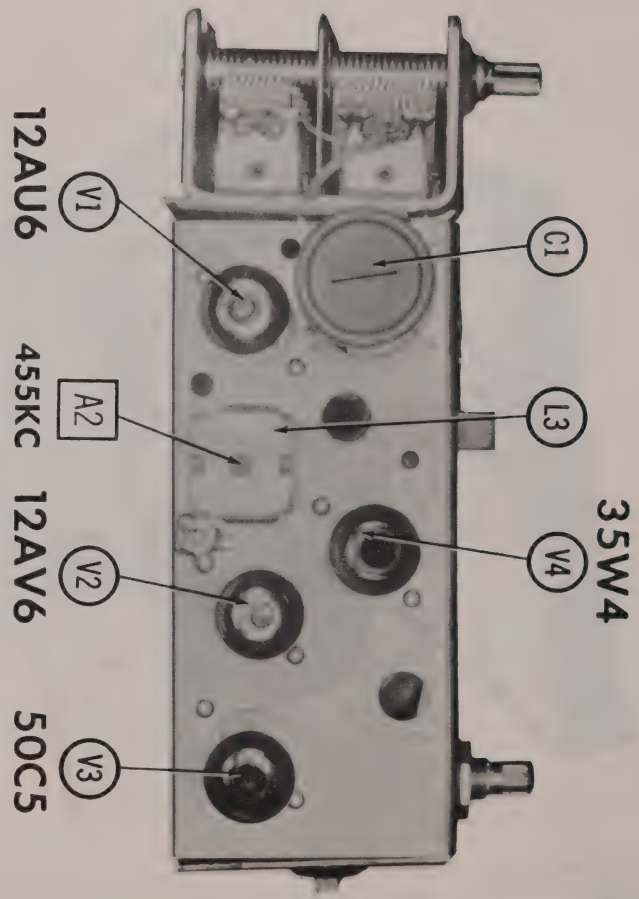
COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ROLAND PART No.	REPLACEMENT DATA	
K1	Audio Coupling	220mmf, 250mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg		Aerovox	PA-113-2
				Centralab	PC-151
				Cornell-Dubilier	116TM2
				Mallory	MS-107
				Sprague	DT-2

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		ROLAND PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick				BC-419			
L2	Osc. Coil							
L3	IF Trans.							

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2600Ω	3-4Ω	430330	24S53	A-3025	AU-605	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ROLAND PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	414001 *	4A07	* Includes Output Transformer

PHONO CARTRIDGE

ITEM No.	ROLAND PART No.	REPLACEMENT DATA							
		ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M1		18 KR314T *	N6-2	26	S-1 S-3				

* Tone Arm

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ROLAND PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M2				

MISCELLANEOUS

ITEM No.	PART NAME	ROLAND PART No.	NOTES
M3 M4 M5	Tuning Cap. Switch Motor Idler Wheel	310121	2 Gang Radio-Phono (DPDT Slide Type) 3 Speed Phono Drive (117V Alliance) Walsco Part No. 1433

CABINETS & CABINET PARTS

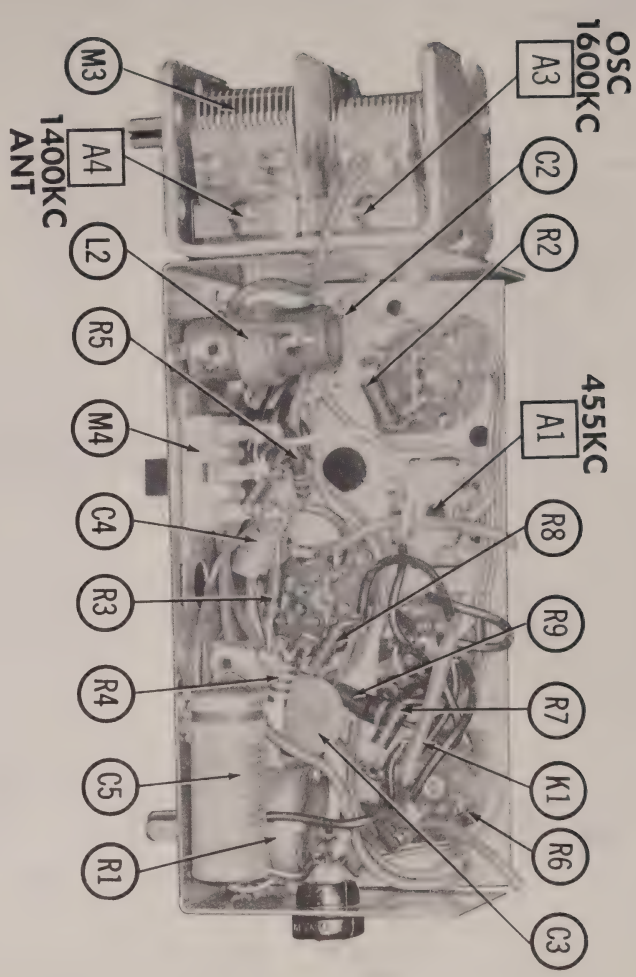
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

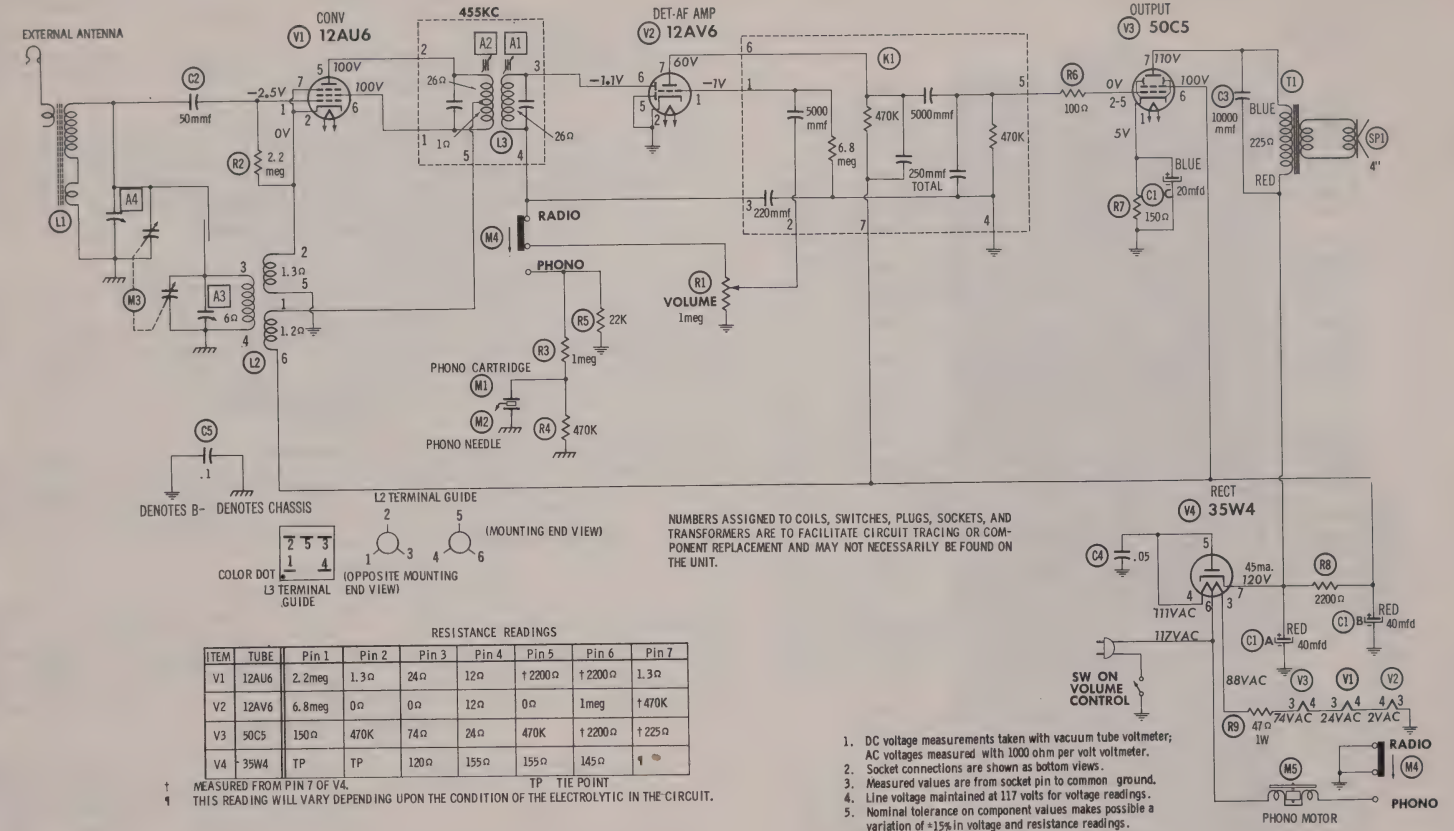
NAME	PART NO.	DESCRIPTION
Knob	270112	Tuning-Volume

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AU6	2.2meg	1.3Ω	24Ω	12Ω	†2200Ω	†2200Ω	1.3Ω
V2	12AV6	6.8meg	0Ω	0Ω	12Ω	0Ω	1meg	†470K
V3	50C5	150Ω	470K	74Ω	24Ω	470K	†2200Ω	†225Ω
V4	35W4	TP	TP	120Ω	155Ω	155Ω	145Ω	¶

† MEASURED FROM PIN 7 OF V4. TP TIE POINT

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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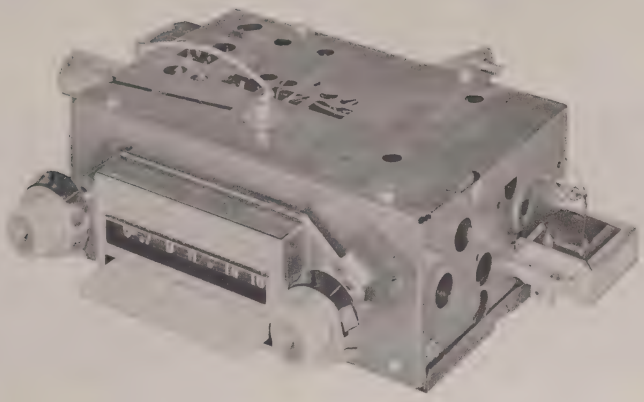
ROLAND
MODEL 31-782

PHOTOFACT® Folder with CIRCUITRACE®

STUDEBAKER MODEL AC-2978

STUDEBAKER
MODEL AC-2978



TRADE NAME	Studebaker Model AC-2978 (For 1960 Studebaker Automobiles)
MANUFACTURER	Delco Radio Div., G. M. Corp., Kokomo, Indiana
TYPE SET	Battery Operated 4 Tube, 1 Transistor Custom Built Automobile AM Receiver
POWER SUPPLY	12 Volt Storage Battery
TUNING RANGE—BROADCAST	535 - 1615KC RATING 2.3 Amp. @ 12.6 Volts DC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1 thru A4..... GENERAL CEMENT #9440
A5, A9, A10..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A6, A7, A8..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	262KC (400% Mod.)	High Freq. End Stop.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
	Check setting of Oscillator core (A5). Rear of core should be 1 5/8" from mounting end of coil form.					
2.	High side thru 68mmf to antenna receptacle. Low side to chassis.	1615KC	"	"	A6, A7, A8	"
3.	"	600KC	600KC Signal.	"	A9, A10	"
4.	"	1615KC	1615KC Signal.	"	A7, A8	"
5.	"	1100KC	1100KC Signal.	"		Adjust pointer adjustment until pointer coincides with 1100 on dial.
6.	With radio installed in car and antenna fully extended, tune in a weak station near 900KC and adjust A8 for maximum output.					

PUSHBUTTON ADJUSTMENT

1. Pull pushbutton out.
2. Tune manually to desired station.
3. Press button in firmly.
4. Repeat for remaining pushbuttons.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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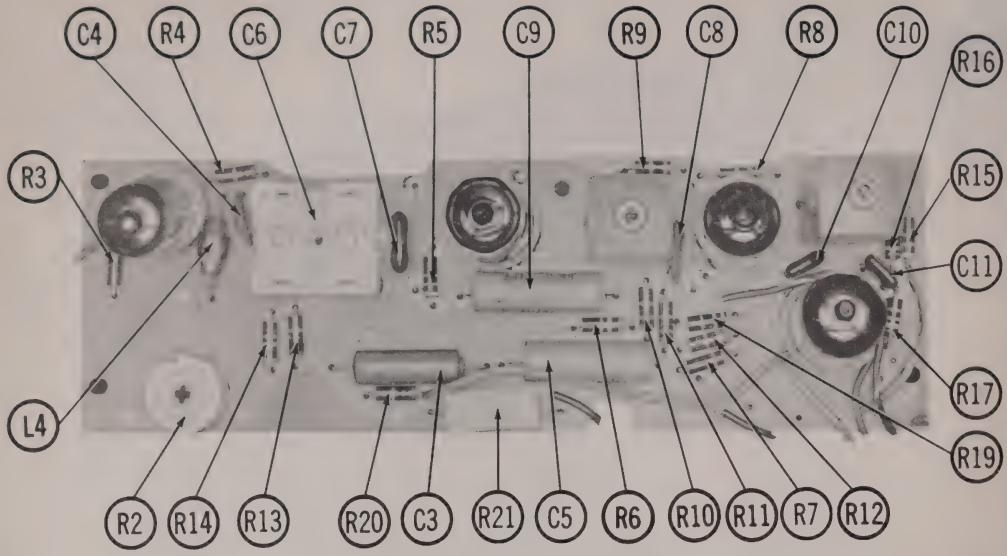
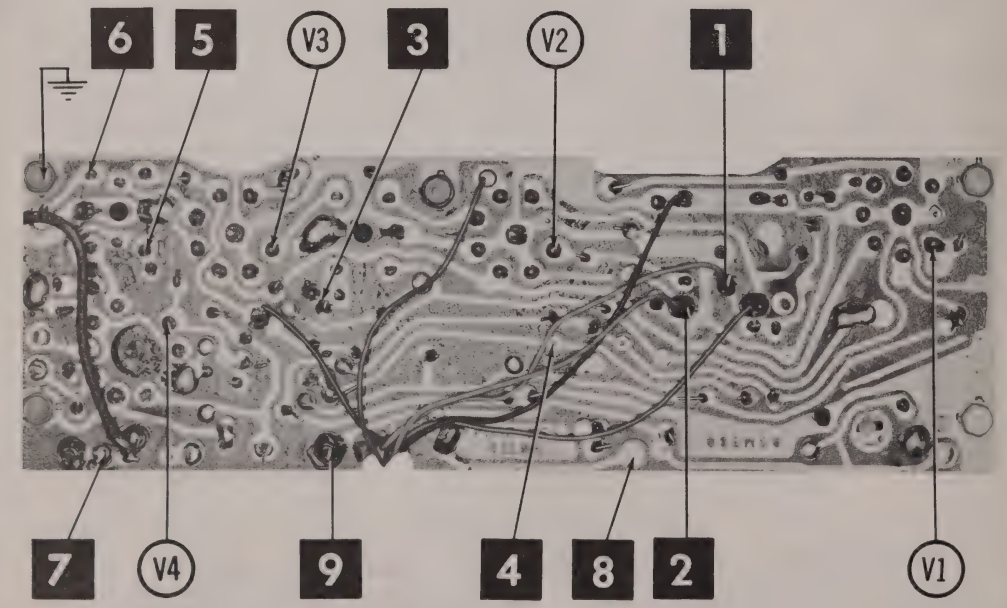
SET498 FOLDER 17



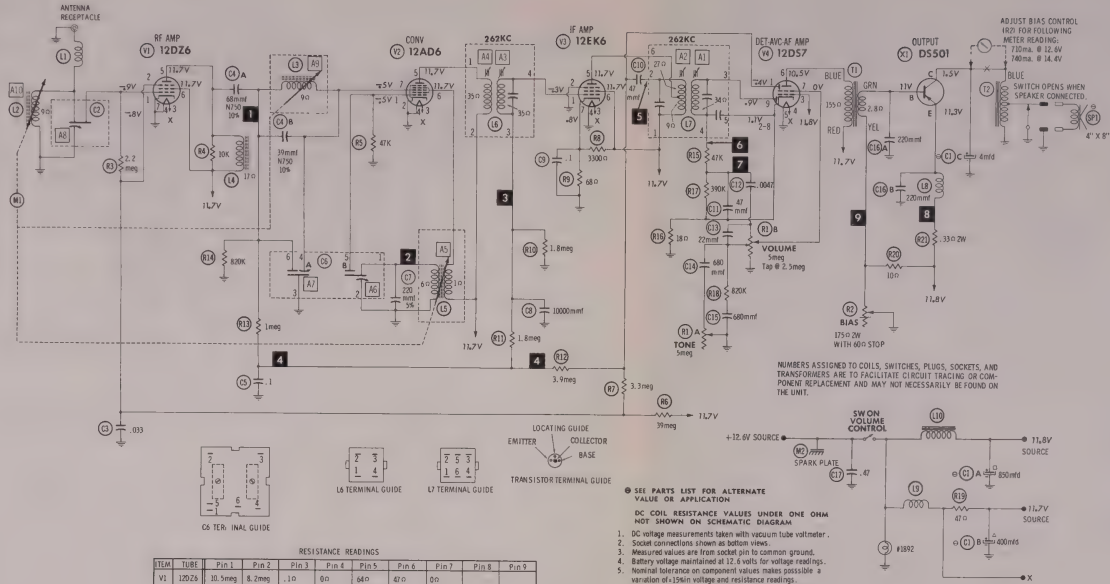
PRINTED BOARD - CAPACITOR, RESISTOR & INDUCTOR IDENT.



A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12DZ6	10.5meg	8.2meg	.1Ω	0Ω	640Ω	47Ω	0Ω		
V2	12AD6	47K	0Ω	.1Ω	0Ω	85Ω	48Ω	680K		
V3	12EK6	2meg	0Ω	.1Ω	0Ω	56Ω	47Ω	68Ω		
V4	12DS7	4.9meg	18Ω	18Ω	.1Ω	0Ω	200Ω	0Ω	18Ω	420K

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN FOR X1 BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE™

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STUDEBAKER
MODEL AC-2978

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire	Use BELDEN No. 8885
Bonding Strap	Use BELDEN No. 8661

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	RF Amplifier	12DZ6
V2	Converter	12AD6
V3	IF Amplifier	12EK6
V4	Det. -AVC-AF Amp.	12DS7

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	DS-501	Output	2N235A			2N677 *	PNP

* Mounting Change, Drill New Mounting Holes.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	■850	16	7273729 ①	AFH3-54-30		WP300.7		TVLS-3021 *	
B	▲400	16							
C	4	11.5							

① Some versions may use Part #7273810 in this application.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2		#7268558						
C3	.033 75V		P288N-033	DD-303	PM4S33	1DP-2-333	GEM-4133	6TM-S33
C4A	68 N750 10%		N750-DI 68	DTN-68	C10Q68U	CCTN-680	CN7-468	10TCU-Q68
B	39 N750 10%			TCN-39	C10Q39U	CCTN-390	CN7-439	10TCU-Q39

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	.1 75V	#7273693	P288N-1	DF-104	CUB2P1	1DP-2-104	GEM-201	2TM-P1
C6A	}							
B	}							
C7	220 5%		1468-00022	TCZ-220	22R5T22	CM-19B-221J	CNO-322	MS-322
C8	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C9	.1 75V		P288N-1	DF-104	CUB2P1	1DP-2-104	GEM-201	2TM-P1
C10	47		1468-000047	TCZ-47	5W5Q47	CM-19B-470M	CNO-447	1FM-447
C11	47		1468-000047	TCZ-47	5W5Q47	CM-19B-470M	CNO-447	1FM-447
C12	.0047 200V		P288N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C13	22		1468-000022	TCZ-22	5W5Q22	CM-19B-220M	CNO-422	1FM-422
C14	680		BPD-00068	DD-681	BYA10T68	CCD-681	B-368	10TS-T68
C15	680		BPD-00068	DD-681	BYA10T68	CCD-681	B-368	10TS-T68
C16A	220		DI-220	DD-221	L10T22	CCD-221	B-322	10TS-T22
B	220		DI-220	DD-221	L10T22	CCD-221	B-322	10TS-T22
C17	.47 100V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P1

Delco Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	5meg		7276130					Tone
B	5meg							Volume
	2meg Tap							
C	Switch							Power Off-On
R2	175Ω	2(WW)	1221422					Bias
	60Ω Stop							

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	2.2meg	
R4	10K	
R5	47K	
R6	39meg	
R7	3.3meg	
R8	3300Ω	
R9	68Ω	

ITEM No.	RATING	REMARKS
R10	1.8meg	
R11	1.8meg	
R12	3.9meg	
R13	1meg	
R14	820K	
R15	47K	
R16	18Ω	

ITEM No.	RATING	REMARKS
R17	390K	
R18	820K	
R19	47Ω	
R20	10Ω	
R21	.33Ω 2W	#7271375

Delco Part Number. Fuse Type.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		DELCO PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	RF Choke	7255738	19-1004	19-1004	BC-565	4610		6.5uh
L2	Ant. Coil	1221138						
L3	RF Coil	1221138						
L4	RF Choke	7269684						1.8MH
L5	Osc. Coil	1221151						
L6	Input IF Trans.	1221257	16-6756	16-6756	BC-344	13-PH1		
L7	Output IF Trans.	1221253			BC-424			
L8	RF Choke	1217846						1.4uh
L9	Hash Choke	1217846						1.4uh

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L10	.740 A	.7Ω	.011 HY	7274342				TC-2		

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	50	1	7269877			TA-48			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE	REPLACEMENT DATA							NOTES
	PRI.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	10Ω Tap@ 3-4Ω	1221428				TA-50			

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	
SP1	4"x 8"	PM	3-4Ω	7275979 *	48A2Z4	* Alternate Part #6117

MISCELLANEOUS

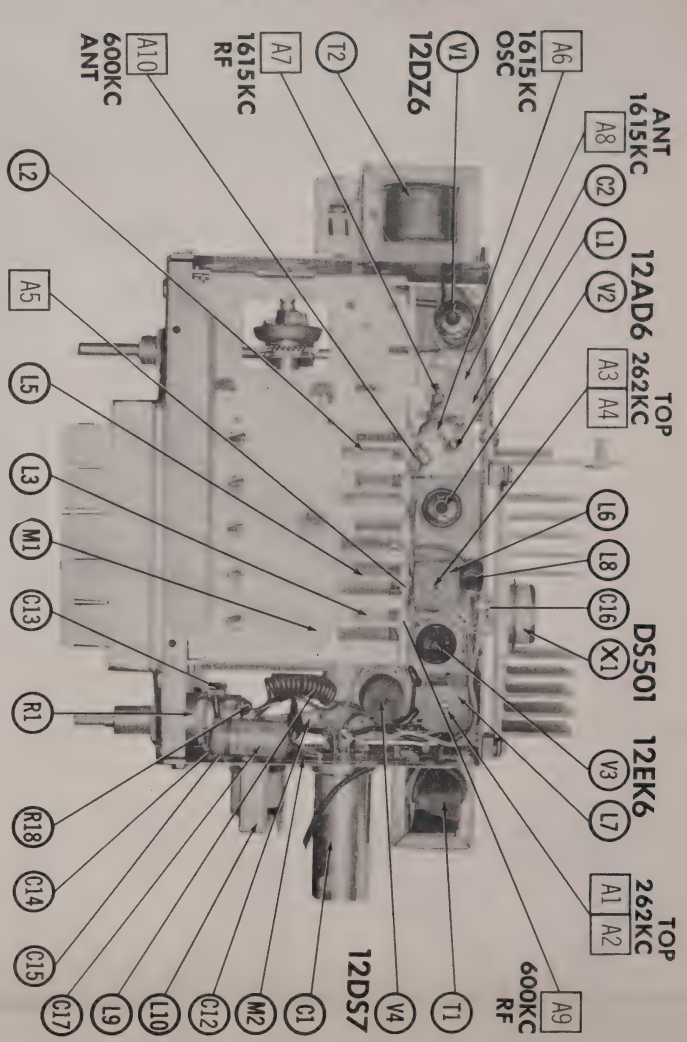
ITEM No.	PART NAME	DELCO PART No.	NOTES
M1	Tuner		Pushbutton Series P2 Type
M2	Spark Plate	7271769	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	7271845	Tuning, Volume
Knob	7271847	Tone
Knob	569555	Dummy
Pushbutton Ass'y.	1221190	Includes Front Bearing Plate & Slide
Pushbutton Ass'y.	7271773	Individual
Pointer Ass'y.	7272127	

CHASSIS—TOP VIEW



PHOTOFACT® Folder with CIRCUITRACE®

SYLVANIA MODELS 7P13, 3100, 3211 (Ch. 1-617-4)

SYLVANIA MODELS 7P13, 3100, 3211 (Ch. 1-617-4)

MODEL 7P13

SYLVANIA MODELS 7P13, 3100, 3211 (Ch. 1-617-4)

TRADE NAME	Sylvania Models 7P13, 3100, 3211 (Ch. 1-617-4)
MANUFACTURER	Sylvania Home Electronics, Div. of Sylvania Electric Products, Inc., 700 Ellicott Street, Batavia, N.Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC (B+) & 1.5 Volts DC (Bias) RATING 6MA @ 9 Volts DC (No Signal, Min. Volume)
TUNING RANGE	BROADCAST 540 - 1650KC 12MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A5 ... GENERAL CEMENT #9440
A4, A6 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1650KC	"	"	A4	"
3.	"	600KC	600KC	"	A5	Adjust for maximum output while rocking tuning gang.
4.	"	1450KC	Tune to 1450KC signal	"	A6	Adjust for maximum output.

DISASSEMBLY

1. Remove tuning and volume knobs (Pull off).
2. Remove screw located under tuning knob.
3. Open rear flap and remove 2 screws holding printed board to brackets.
4. Remove printed board. (Right side)

SET 498 FOLDER 18

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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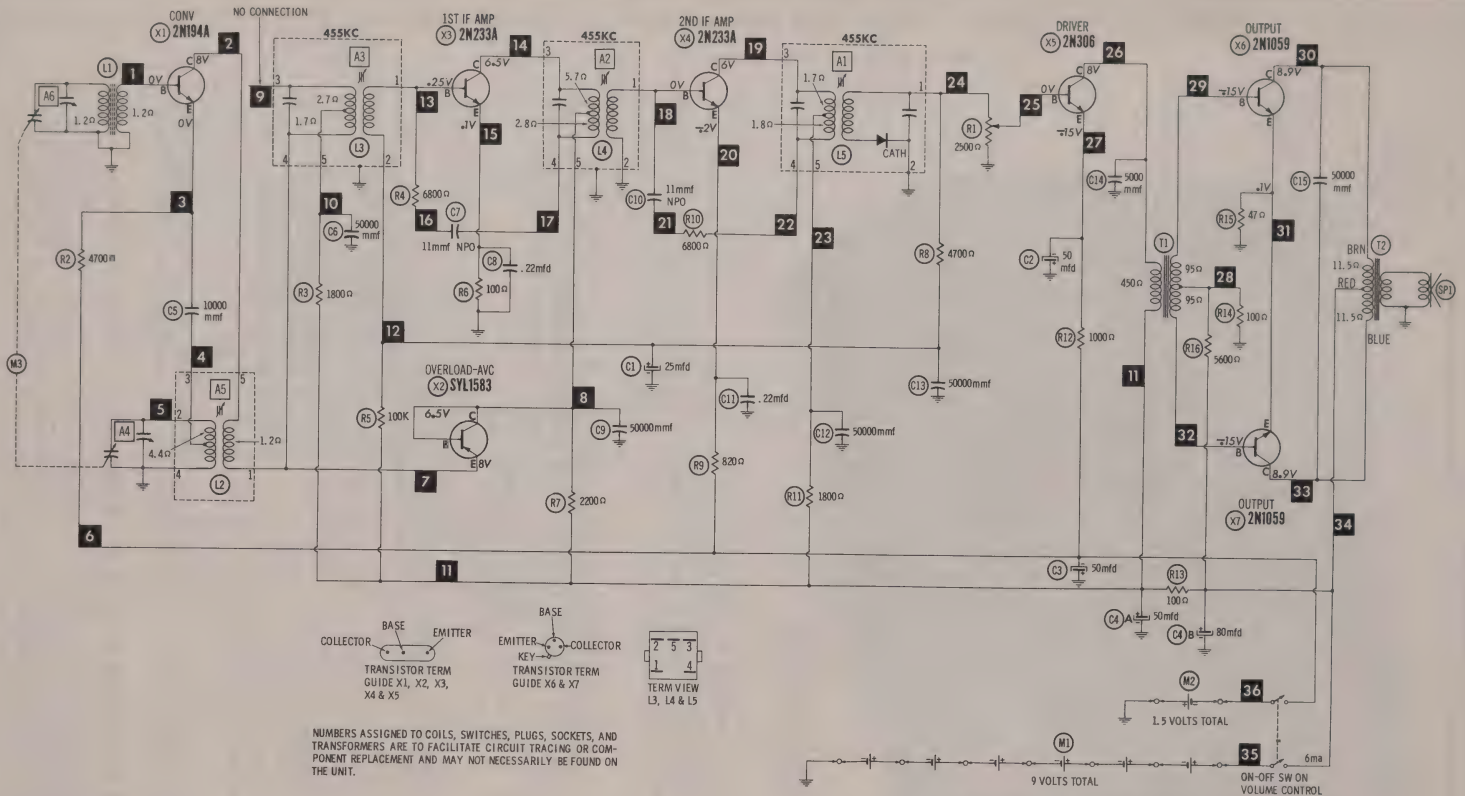

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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SYLVANIA MODELS 7P13, 3100, 3211 (Ch. 1-617-4)

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N194A	Converter	2N444		2N1366	2N194A	NPN
X2	SYL1583	Overload & AVC		2N410	CK879	SYL1583	PNP
X3	2N233A	1st IF Amp.	2N444		2N1367	2N233A	NPN
X4	2N233A	2nd IF Amp.	2N444		2N1367	2N233A	NPN
X5	2N306	Driver	2N306	2N649		2N306	NPN
X6	2N1059	Output	2N444	2N649		2N1059	NPN
X7	2N1059	Output	2N444	2N649		2N1059	NPN

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	SYLVANIA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	25	3	161-1045	XPP-3025	NLW25-3	TT3X25	ML25-3	TE-1055	
C2	50	3	161-1043	XPP-3050	NLW50-3	TT6X50	ML50-3	TE-1058	
C3	50	3	161-1043	XPP-3050	NLW50-3	TT6X50	ML50-3	TE-1058	
C4A	50	10	161-2020	BCD10X8050	NLW50-10	PETA2385		VL-2350	
B	80	10			NLW75-10				

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	10000		BPD-01	DD-103	BYA105L	CCD-103	B-110	5HK-S10
C6	50000		BPD-05	DD-503	H-05S5	1DP-2-503	GP150	5HK-S50
C7	11 NPO		NPO-DI 10	DTZ-10	C10QIC	CCTO-100	CNO-410	10TCC-QI0
C8	.22mfd 3V	#169-0067		UK-224				
C9	50000		BPD-05	DD-503	H-05S5	1DP-2-503	GP150	5HK-S50
C10	11 NPO		NPO-DI 10	DTZ-10	C10QIC	CCTO-100	CNO-410	10TCC-QI0
C11	.22mfd 3V	#169-0067		UK-224				
C12	50000		BPD-05	DD-503	H-05S5	1DP-2-503	GP150	5HK-S50
C13	50000		BPD-05	DD-503	H-05S5	1DP-2-503	GP150	5HK-S50
C14	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C15	50000		BPD-05	DD-503	H-05S5	1DP-2-503	GP150	5HK-S50

[4] Sylvania Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SYLVANIA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	2500Ω	½	152-0042					Volume and Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	4700Ω	
R3	1800Ω	
R4	6800Ω	
R5	100K	
R6	100Ω	

ITEM No.	RATING	REMARKS
R7	2200Ω	
R8	4700Ω	
R9	820Ω	
R10	6800Ω	
R11	1800Ω	

ITEM No.	RATING	REMARKS
R12	1000Ω	
R13	100Ω	
R14	100Ω	
R15	47Ω	
R16	5600Ω	

PRINTED BOARD

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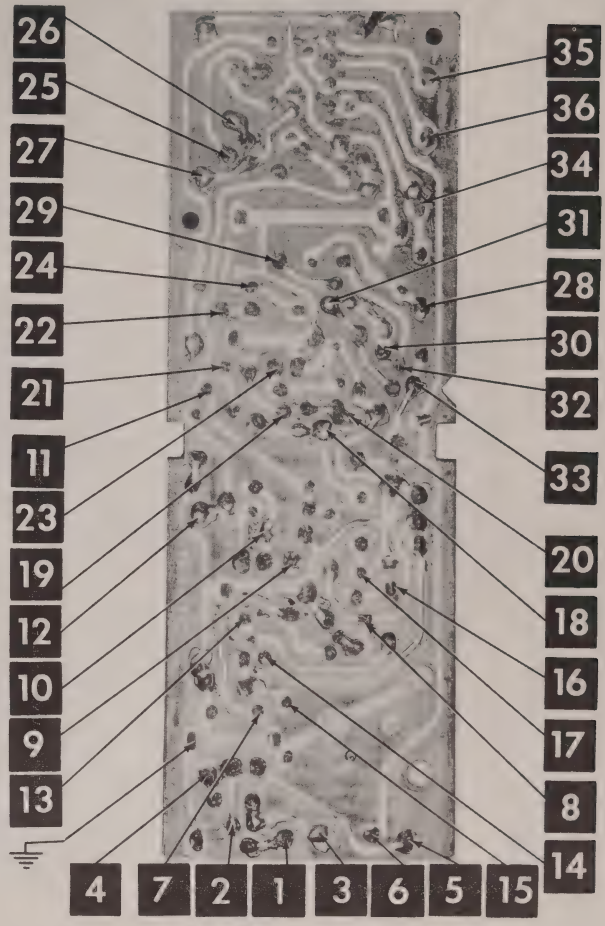


PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		SYLVANIA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	581-0012						* Includes Detector Crystal
L2	Osc. Coil	113-0039						
L3	1st IF Trans	121-0109						
L4	2nd IF Trans	121-0103						
L5	3rd IF Trans	122-0031 *						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SYLVANIA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.5	1	143-0063						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SYLVANIA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	250Ω CT	6-8Ω	143-0062							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SYLVANIA PART No.	QUAM PART No.	
SP1	4"	PM	6-8Ω	539-0425	4A07Z6	

BATTERIES

ITEM No.	VOLTAGE	SYLVANIA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V			130 *		635 *		M-14R *	* 6 Required
M2	1.5V			130 †		635 †		M-14R †	† Bias Supply

MISCELLANEOUS

ITEM No.	PART NAME	SYLVANIA PART No.	NOTES
M3	Tuning Cap.	170-0036	2 Gang

CABINETS & CABINET PARTS

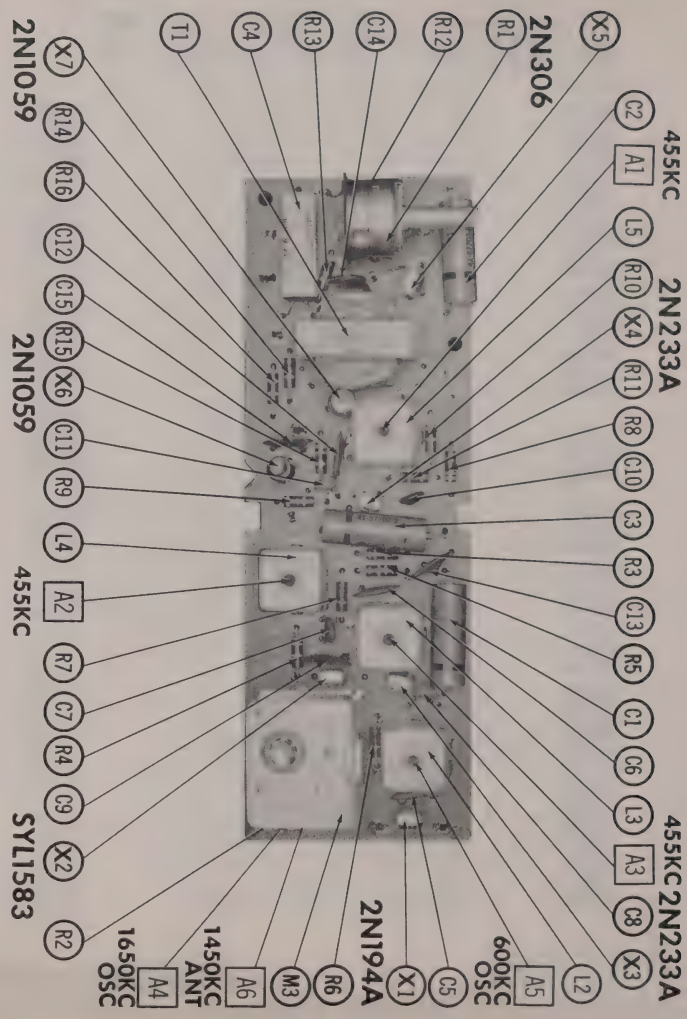
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	741-0059	Tuning, Model 7P13
Knob	741-0078	Tuning, Model 3100
Knob	741-0079	Tuning, Model 3211
Knob	740-0298	Volume, Model 7P13
Knob	740-0323	Volume, Model 3100
Knob	740-0324	Volume, Model 3211
Cabinet	814-0014	Leather, Model 7P13
Cabinet	814-0019	Leather, Model 3100
Cabinet	814-0020	Leather, Model 3211
Handle	818-0265	Cabinet, Model 3100
Handle	818-0266	Cabinet, Model 3211

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder

V-M MODELS
580-2, 581, 582

V-M MODELS
580-2, 581, 582

MODEL 581

V-M MODELS
580-2, 581, 582

TRADE NAME	V-M Models 580-2, 581, 582
MANUFACTURER	V-M Corp., Benton Harbor, Michigan
TYPE SET	AC Operated 8 Tube Stereo Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 82 Watts, .78 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE V-M 1201 - PHOTOFACT SET 436 FOLDER 18 OR RECORD CHANGER MANUAL RC-12

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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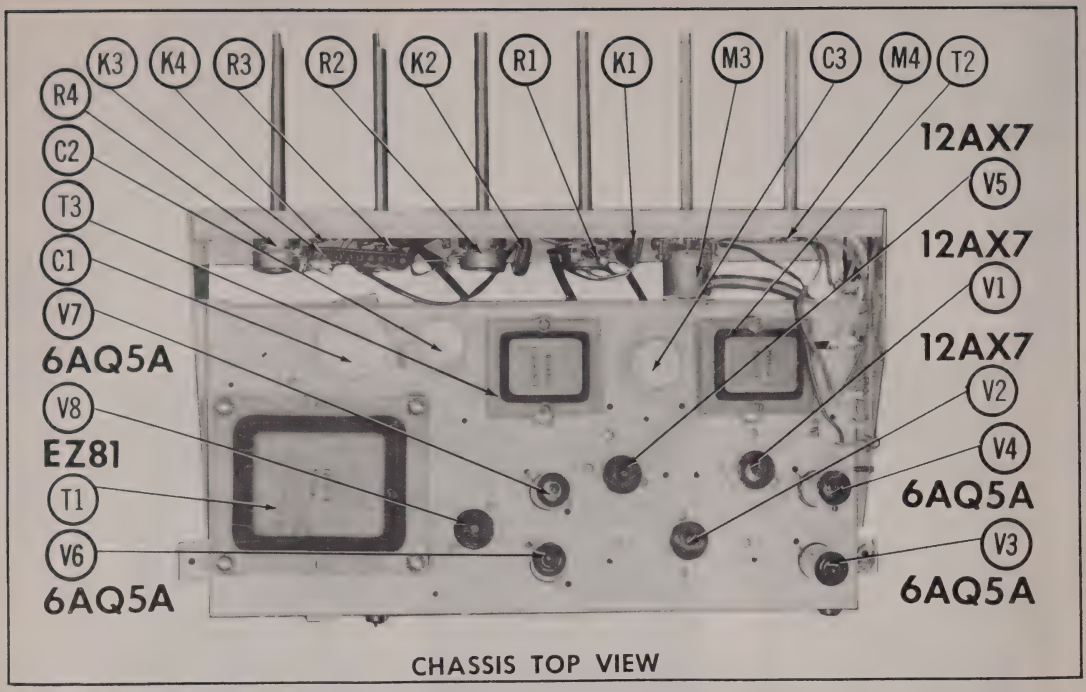
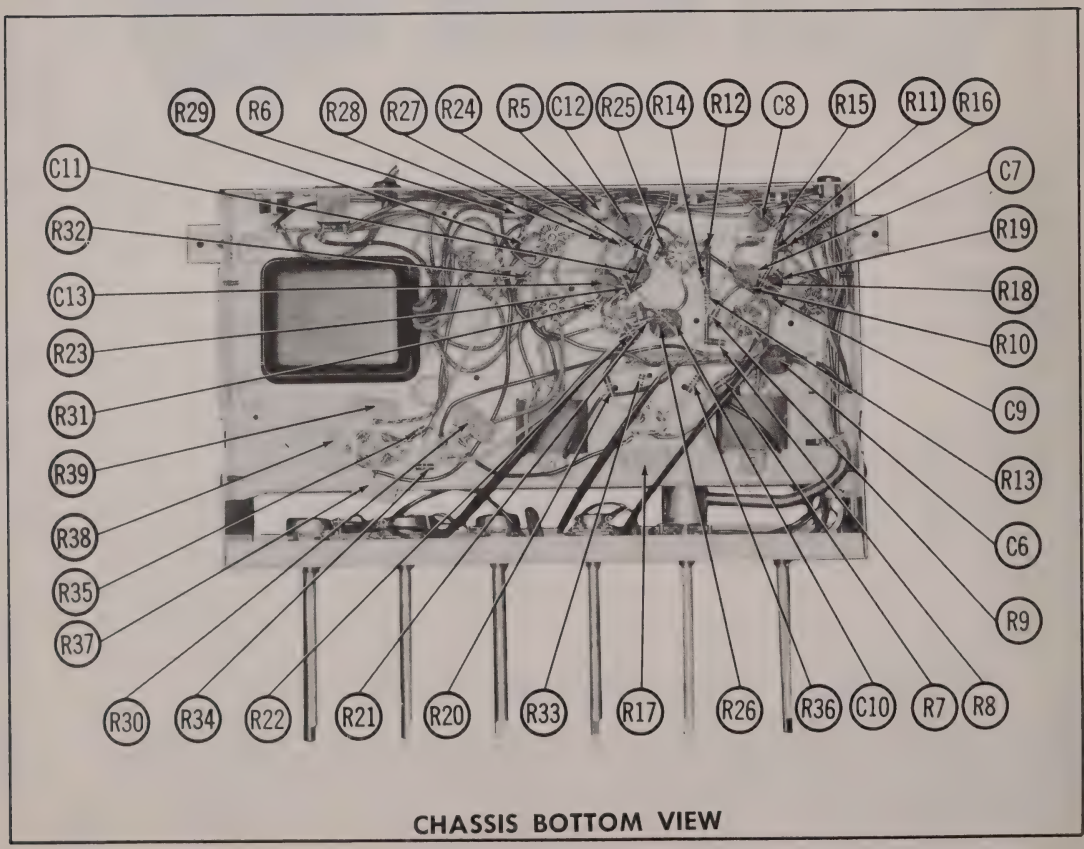
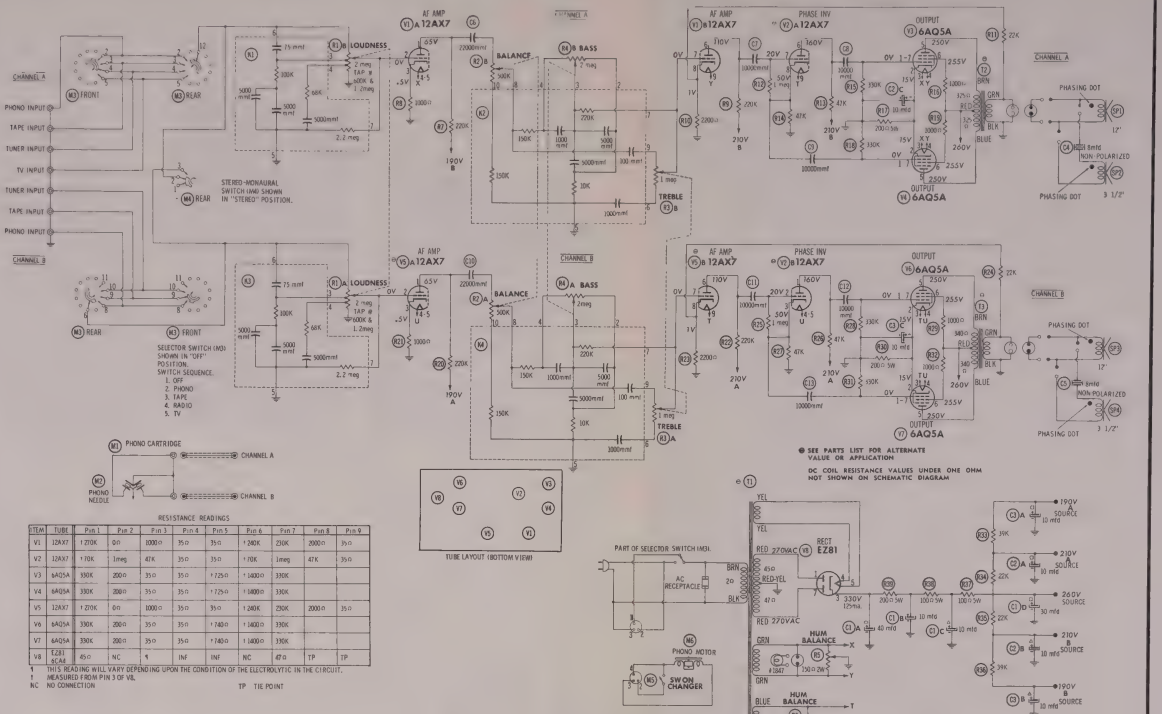


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW



● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	1 270K	0Ω	1000Ω	35Ω	35Ω	1 240K	250K	2000Ω	35Ω
V2	12AX7	1 70K	1meg	47K	35Ω	35Ω	1 70K	1meg	47K	35Ω
V3	6AQ5A	330K	250Ω	35Ω	35Ω	1 725Ω	1 1400Ω	330K		
V4	6AQ5A	330K	200Ω	35Ω	35Ω	1 725Ω	1 1400Ω	330K		
V5	12AX7	1 270K	0Ω	1000Ω	35Ω	35Ω	1 240K	250K	2000Ω	35Ω
V6	6AQ5A	330K	250Ω	35Ω	35Ω	1 740Ω	1 1400Ω	330K		
V7	6AQ5A	330K	200Ω	35Ω	35Ω	1 740Ω	1 1400Ω	330K		
V8	EZ81 6CA4	450	NC	1	INF	INF	NC	47Ω	TP	TP

1 THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
1 MEASURED FROM PIN 3 OF V8.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Channel A AF Amp.	12AX7 (ECC83) * (7025) *
V2	Channel A Phase Inv. - Channel B Phase Inv.	12AX7 (ECC83) * (7025) *
V3	Channel A Output	6AQ5A
V4	Channel A Output	6AQ5A
V5	Channel B AF Amp.	12AX7 (ECC83) * (7025) *
V6	Channel B Output	6AQ5A
V7	Channel B Output	6AQ5A
V8	Rectifier	EZ81/6CA4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA V-M PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	12116	AFH4-18-10	D0171	FP446	TMQ-18 TD-10-450	TVL-4771.8	
B	10	450							
C	▲10	450							
D	■30	450							
C2A	■10	450	12117	AFH3-124	C0240	FP375.8	TMT-32	TVL-3729	
B	▲10	450							
C	10	25							
C3A	■10	450	12117	AFH3-124	C-240	FP375.8	TMT-32	TVL-3729	
B	▲10	450							
C	10	25							
C4	8	25NP	12090	PRS7315		TCN5010		TVANS-1203.8*	
C5	8	25NP	12090	PRS7315		TCN5010		TVANS-1203.8*	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	22000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C7	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C8	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C9	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C10	22000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C11	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C12	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C13	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA V-M PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg *	1/2	12404	BT-175				Loudness, Channel B
B	2meg *	1/2		STR-175				Loudness, Channel A
C	Shaft			AK-22				
R2A	500K	1/2	12402	B-59	AD47-500K-S			Balance, Channel B
B	500K	1/2		SR-59	Not Req.			Balance, Channel A
C	Shaft			AK-22	FS-5			
R3A	1meg	1/2	12403	B-70				Treble, Channel B
B	1meg	1/2		SR-70				Treble, Channel A
C	Shaft			AK-22				
R4A	2meg	1/2	12405	B-76	AD47-2meg-Z			Bass, Channel B
B	2meg	1/2		SR-76	Not Req.			Bass, Channel A
C	Shaft			AK-22	FS-5			
R5	150Ω	2(WW)	12361					Hum Adjust, Channel A
R6	150Ω	2(WW)	12361					Hum Adjust, Channel B

* Taps @ 600K and 1.2meg.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R7	220K	
R8	1000Ω	
R9	220K	
R10	2200Ω	
R11	22K	
R12	1meg	
R13	47K	
R14	47K	
R15	330K	
R16	1000Ω	
R17	300Ω 5W	

ITEM No.	RATING	REMARKS
R18	330K	
R19	1000Ω	
R20	220K	
R21	1000Ω	
R22	220K	
R23	2200Ω	
R24	22K	
R25	1meg	
R26	47K	
R27	47K	
R28	330K	

ITEM No.	RATING	REMARKS
R29	1000Ω	
R30	200Ω 5W	
R31	330K	
R32	1000Ω	
R33	39K	
R34	22K	
R35	22K	
R36	39K	
R37	100Ω 5W	
R38	100Ω 5W	
R39	200Ω 5W	

PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	V-M PART No.	REPLACEMENT DATA
K1	Loudness Comp.	75mmf, 5000mmf, 5000mmf, 5000mmf, 68K, 100K, 2.2meg	20830	
K2	Tone Comp.	100mmf, 1000mmf, 1000mmf, 5000mmf, 5000mmf, 10K, 150K, 150K, 220K	20829	
K3	Loudness Comp.	75mmf, 5000mmf, 5000mmf, 5000mmf, 68K, 100K, 2.2meg	20830	
K4	Tone Comp.	100mmf, 1000mmf, 1000mmf, 5000mmf, 5000mmf, 10K, 150K, 150K, 220K	20829	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	V-M PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .78A	540VCT @ .125A	6.3V @ .9A	12587-3 ①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 1.4A	6.3V @ 1.5A								

① Alternate Part #12587.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	V-M PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5700Ω CT	3-4Ω	12588-A-1 ①							① Alternate Part #12588-A ② Alternate Part #12588-B
T3	7000Ω CT	3-4Ω	12588-B-1 ②							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	V-M PART No.	QUAM PART No.	
SP1	12"	PM	3-4Ω	20812-2	12A6AZ4	
SP2	3½"	PM	3-4Ω	20813-1	3AI5TZ3	
SP3	12"	PM	3-4Ω	20812-2	12A6AZ4	
SP4	3½"	PM	3-4Ω	20813-1	3AI5TZ3	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA								
	V-M PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M1	16708-G	13TB		26S	S1-1 & S3-3	53	J43 & J47X	8TA4-S	N-8TA-S

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS	
	V-M PART No.	CLEVITE WALCO PART No.	JENSEN PART No.		
M2	18626-B	W-103STSS † or W-103STDS †♦	S-69X † or S-69XSD †♦ or S-69XDD ♦	† Jewel	♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	V-M PART No.	NOTES
M3	Switch	18969	Function (Rotary Wafer)
M4	Switch	19003	Monaural - Stereo (Rotary Wafer)
M5	Switch	21338	AC Off-On, Changer (Part of Changer)
M6	Motor Ass'y	18361	Complete, Includes Alliance Motor #9134
	Motor Ass'y	18781	Complete, Includes G I Motor #9134

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	20882-A	Loudness, Bass, Treble, Balance, Function, Monaural-Stereo
Knob	16791-A46	Off-On Reject (Part of Changer)
Knob	16792-A46	Speed Control (Part of Changer)
Cabinet	18903-B	Blond (Center Unit), Model 580-2
Cabinet	18903-W	Walnut (Center Unit), Model 580-2
Cabinet	20803-M	Mahogany (Center Unit), Model 581
Cabinet	20804-C	Model 582 (Center Unit)
Cabinet	20806-B	Speaker Enclosure (Left Hand, Blond), Model 580-2
Cabinet	20807-B	Speaker Enclosure (Right Hand, Blond), Model 580-2
Cabinet	20806-W	Speaker Enclosure (Left Hand, Walnut), Model 580-2
Cabinet	20807-W	Speaker Enclosure (Right Hand, Walnut), Model 580-2
Cabinet	20810-M	Speaker Enclosure (Left Hand), Model 581
Cabinet	20811-M	Speaker Enclosure (Right Hand), Model 581
Cabinet	20810-C	Speaker Enclosure (Left Hand), Model 582
Cabinet	20811-C	Speaker Enclosure (Right Hand), Model 582
Cabinet Legs	18907-A	Blond, Models 580-2
Cabinet Legs	18907-B	Walnut, Models 580-2

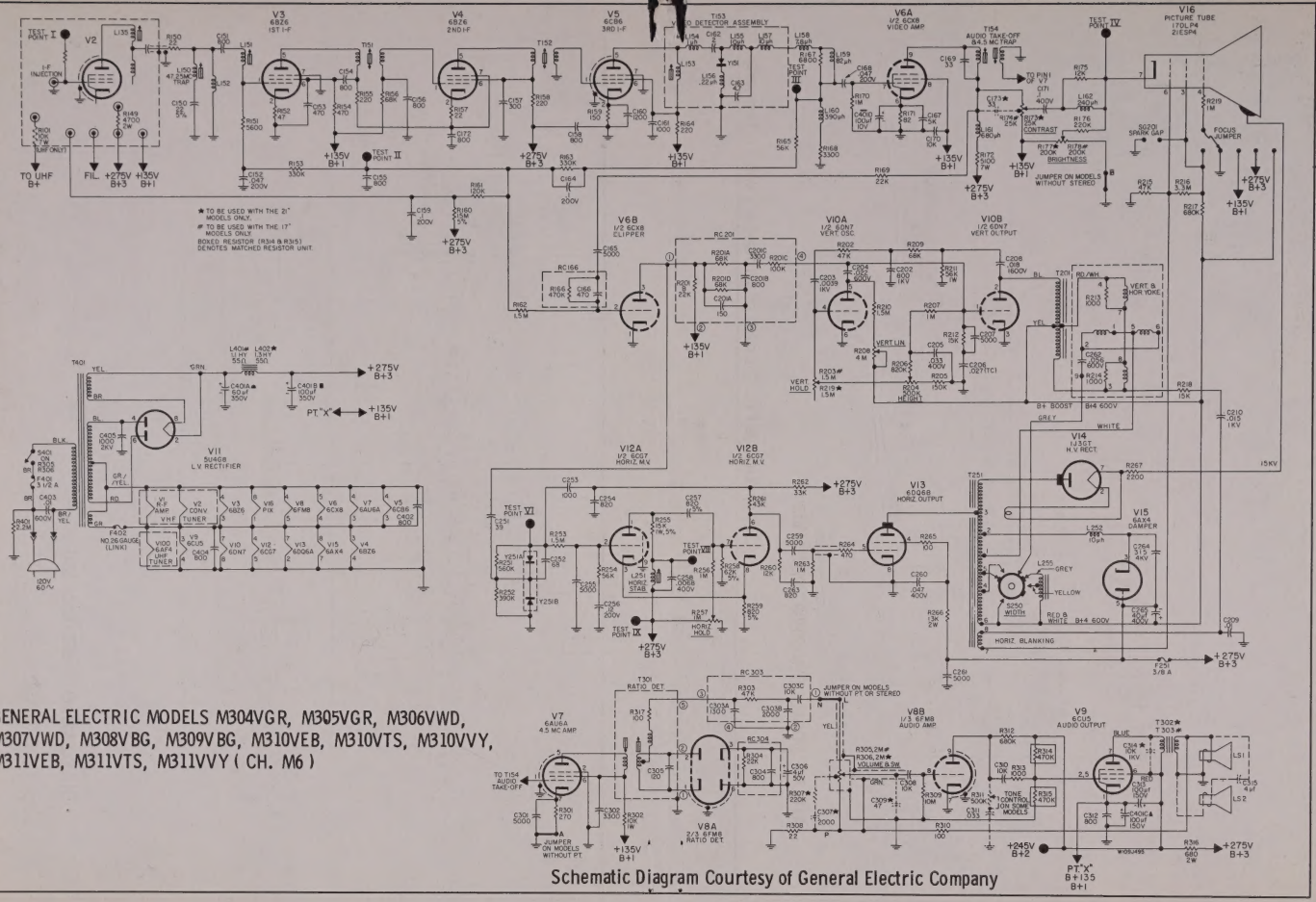
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)



GENERAL ELECTRIC MODELS M304VGR, M305VGR, M306VWD, M307VWD, M308VBG, M309VBG, M310VEB, M310VTS, M310VVY, M311VEB, M311VTS, M311VVY (CH. M6)

Schematic Diagram Courtesy of General Electric Company

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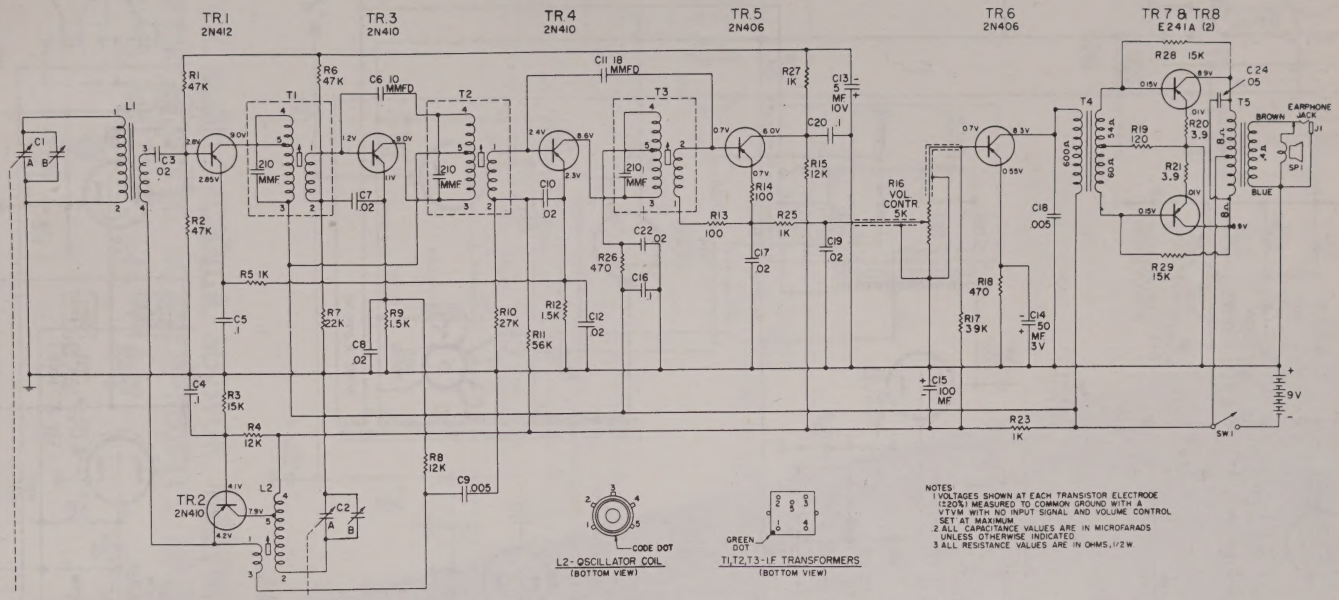
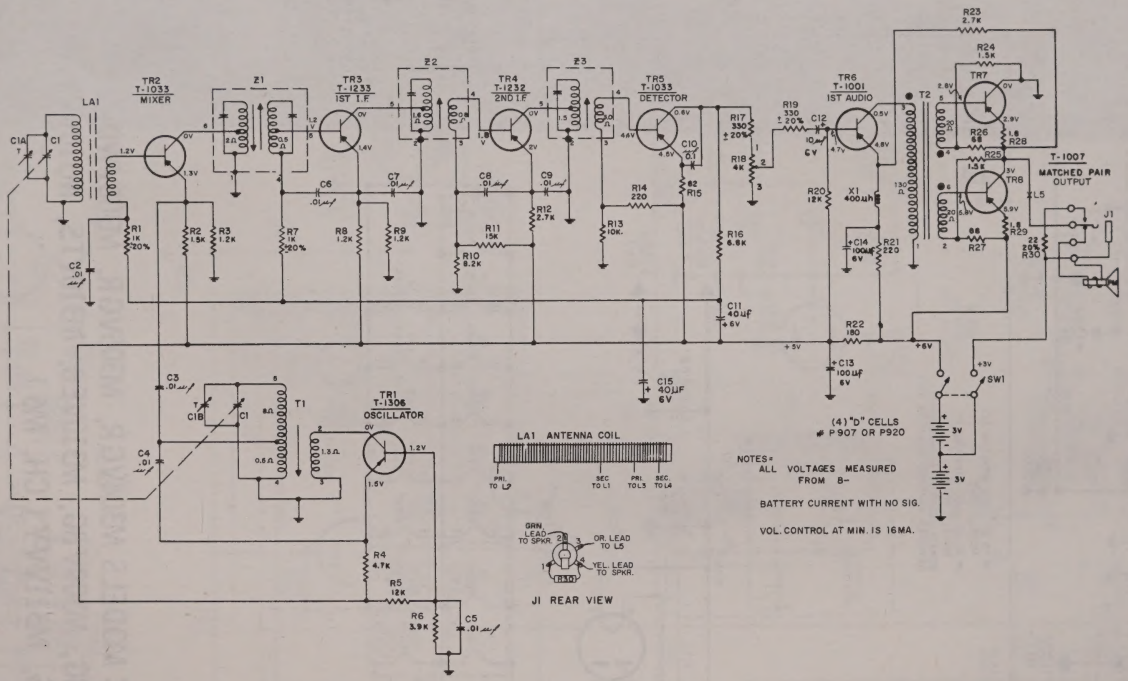


AIRLINE MODELS GEN-2030A, GEN-2030B

Schematic Diagram Courtesy of Montgomery Ward & Company



PHILCO MODEL T-802 (Code 124)

Schematic Diagram Courtesy of Philco Corporation